FCC Test Report

Report No.: AGC00940190102FE03

FCC ID	:	2AOGVJAXMV50JM
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Smart phone
BRAND NAME	:	Vonino
MODEL NAME	:	JAX M
CLIENT	:	VONINO ELECTRONICS LIMITED
DATE OF ISSUE	:	Mar. 01, 2019
STANDARD(S) **TEST PROCEDURE(S)**	:	FCC Part 15 Rules ANSI C63.10 (2013)
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar. 01, 2019	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

1.1. PRODUCT DESCRIPTION

Applicant	VONINO ELECTRONICS LIMITED
Address	Vonino Electronics (HK) Limited #1109, 11/F, Kowloon Center 33 Ashley Road, Tsim Sha Tsui, Kowloon, Hong Kong
Manufacturer	VONINO ELECTRONICS LIMITED
Address	Vonino Electronics (HK) Limited #1109, 11/F, Kowloon Center 33 Ashley Road , Tsim Sha Tsui, Kowloon, Hong Kong
Factory	Guangdong Homecare High-Technology Co., Ltd
Address	Guangdong homecare high-tech industrial park, wuliting, puzhai town, fengshun county, meizhou city, guangdong province
Equipment	Smart phone
Model Name	JAX M
Hardware Version	Y393B_MB_V2
Software Version	Y393B16.YBT.V51B10.EU.16+1.8.1.Go.V01.01.20181228
Antenna Type	PIFA Antenna
Antenna Gain	1.0dBi
BT Operation frequency	2.402 GHz to 2.480GHz
Bluetooth Version	V4.0
Number of Channels	79(For BR/EDR)
Modulation Type	GFSK, π /4-DQPSK, 8DPSK
Power Supply	DC3.7V by Battery
Date of test	Feb. 27, 2019~Mar. 01, 2019

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance(Shenzhen) 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 15.247.

The test results of this report relate only to the tested sample identified in this report.

Tested By	Jeast	
	Jeast Zhan(Zhan jiangdong)	Mar. 01, 2019
Reviewed By	Bart Xie	
	Bart Xie(Xie Xiaobin)	Mar. 01, 2019
Approved By	Forrest Lei	
	Forrest Lei(Lei Yonggang) Authorized Officer	Mar. 01, 2019

1.2. TABLE OF CARRIER FREQUENCYS

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

1.3. 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.

1.4. 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

1.5. 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 ehavior zation 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 ehavior:
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.

1.6. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AOGVJAXMV50JM** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

1.7. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.8. SPECIAL ACCESSORIES

Refer to section 5.2.

1.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2. MEASUREMENT UNCERTAINTY

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. DESCRIPTION OF TEST MODES

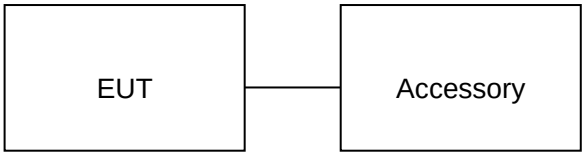
NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel π /4-DQPSK
5	Middle channel π /4-DQPSK
6	High channel π /4-DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	Normal Hopping

Note:
1. All the test modes can be supply by Built-in Li-ion 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.

4. SYSTEM TEST CONFIGURATION

4.1. CONFIGURATION OF EUT SYSTEM

Configuration:



4.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Smart phone	JAX M	2AOGVJAXMV50JM	EUT
2	Adapter	TPA-97070070VM	DC 5.0V 1A	Accessory
3	Battery	V50JM	DC3.7V / 2150mAh	Accessory
4	USB	N/A	N/A	Accessory

4.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Peak Output Power	Compliant
§15.247	20 dB Bandwidth	Compliant
§15.247	Spurious Emission	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.207	Power Line Conduction Emission	Compliant
§15.247	Number of Hopping Frequency	Compliant
§15.247	Time of Occupancy	Compliant
§15.247	Frequency Separation	Compliant

5. 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
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

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
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	/	Mar.01,2018	Feb. 28, 2020
Horn Ant (18G-40GHz)	ETS	QWH_SL_18_40_K_SG	/	Mar.01,2018	Feb. 28, 2020

6. PEAK OUTPUT POWER

6.1. MEASUREMENT PROCEDURE

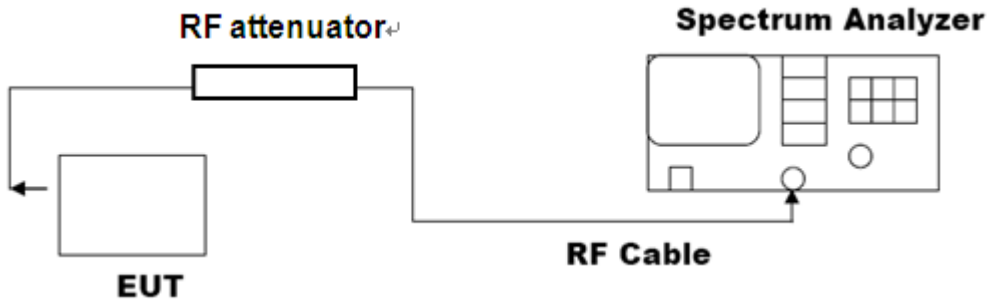
For peak power test:

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. Use the following spectrum analyzer settings:
   1) Span : Approximately five times the 20 dB bandwidth, centered on a hopping channel.
   2) RBW > 20 dB bandwidth of the emission being measured.
   3) VBW ≧ RBW.
   4) Sweep: Auto.
   5) Detector function: Peak.
   6) Trace: Max hold.
4. Record the maximum power from the Spectrum Analyzer.

Note：The EUT was tested according for compliance ANSI C63.10 (2013) requirements.

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

PEAK POWER TEST SETUP



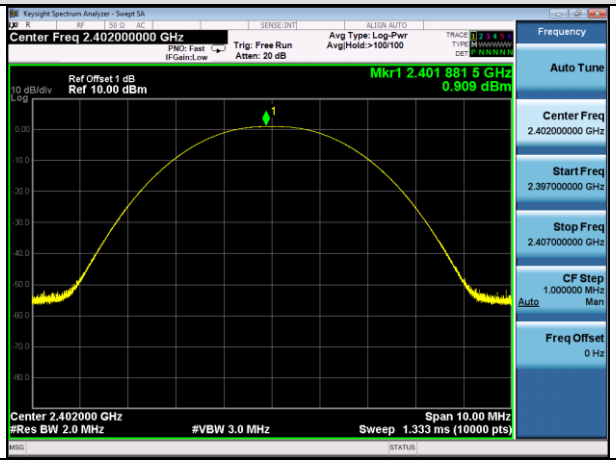
6.3. LIMITS AND MEASUREMENT RESULT

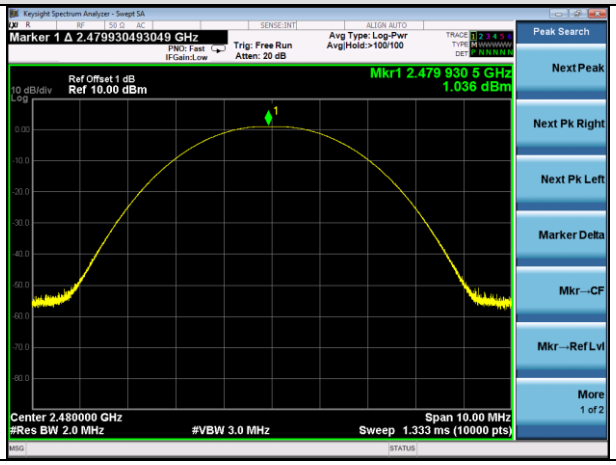
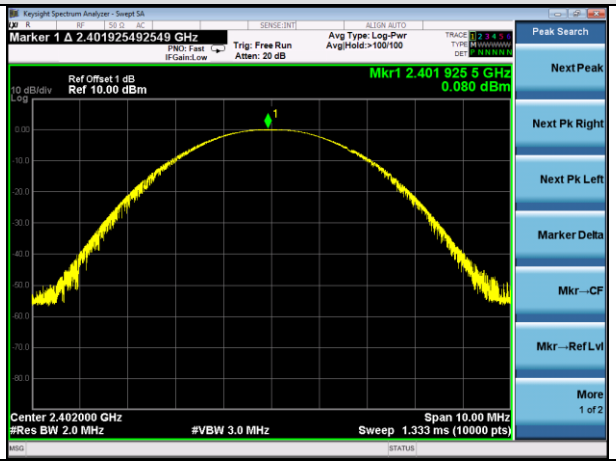
Mode	Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
GFSK	2.402	0.909	30	Pass
	2.441	1.013	30	Pass
	2.480	1.036	30	Pass

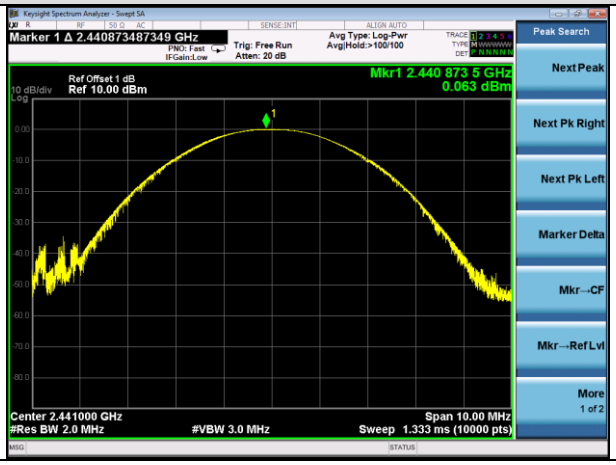
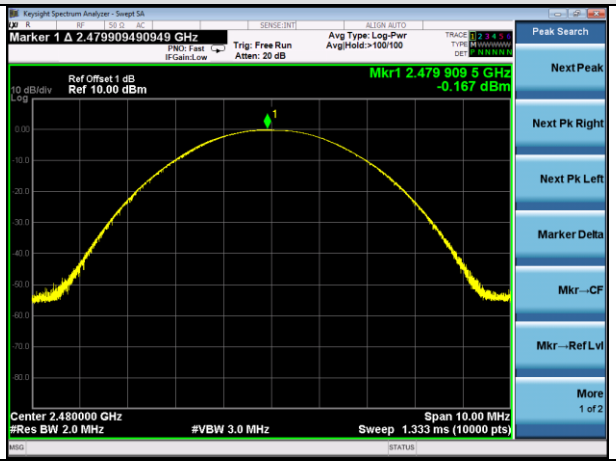
Mode	Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
π /4-DQPSK	2.402	0.080	30	Pass
	2.441	0.063	30	Pass
	2.480	-0.167	30	Pass

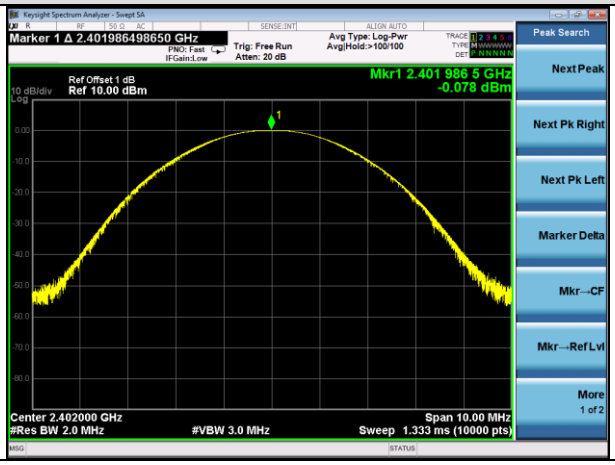
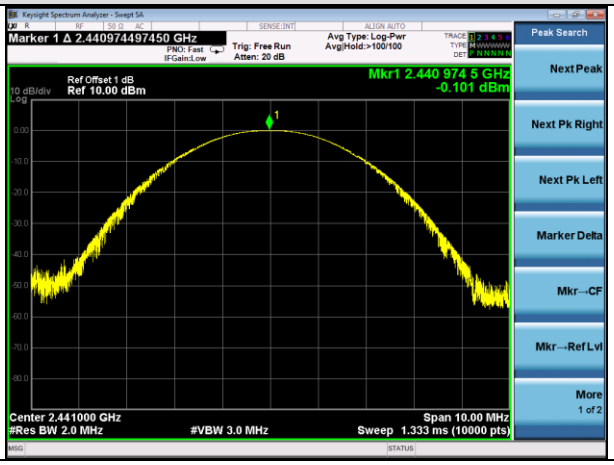
Mode	Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
8DPSK	2.402	-0.078	30	Pass
	2.441	-0.101	30	Pass
	2.480	-0.356	30	Pass

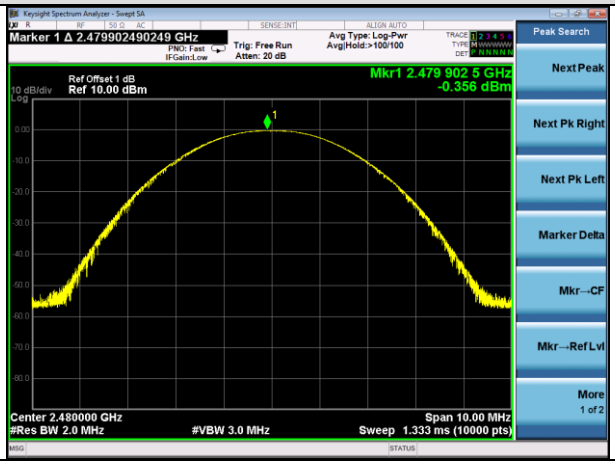
Test Graph

GFSK-LCH	GFSK-MCH
	

GFSK-HCH	π/4DQPSK-LCH
	

π/4DQPSK-MCH	π/4DQPSK-HCH
	

8DPSK-LCH	8DPSK-MCH
	

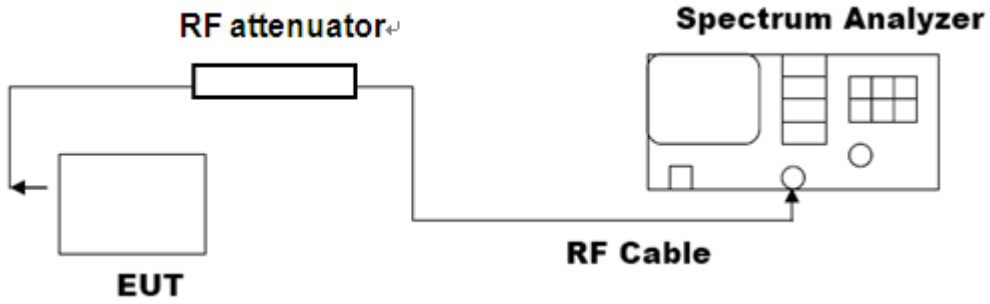
8DPSK-HCH	
	

7. 20DB BANDWIDTH

7.1. 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 ≥ RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

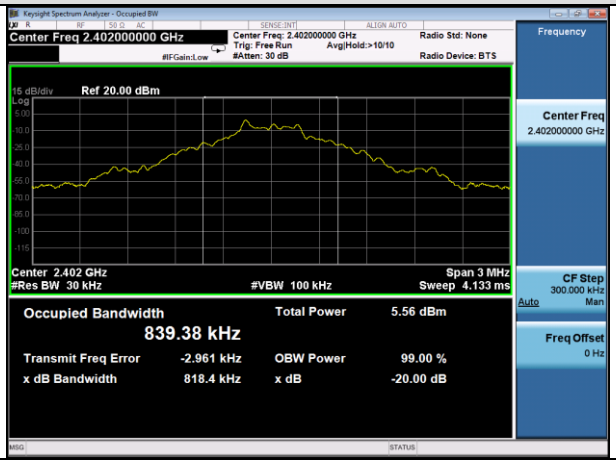
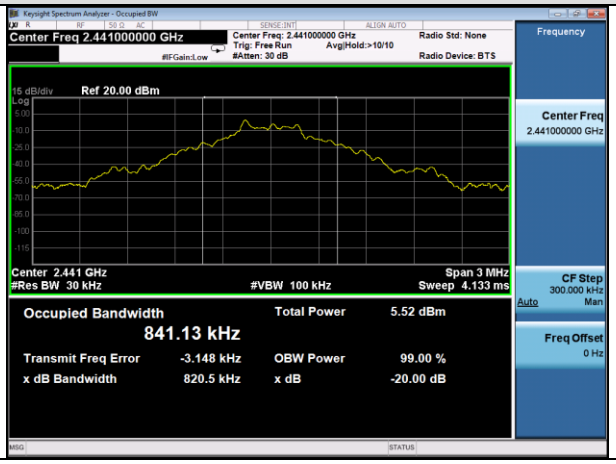
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

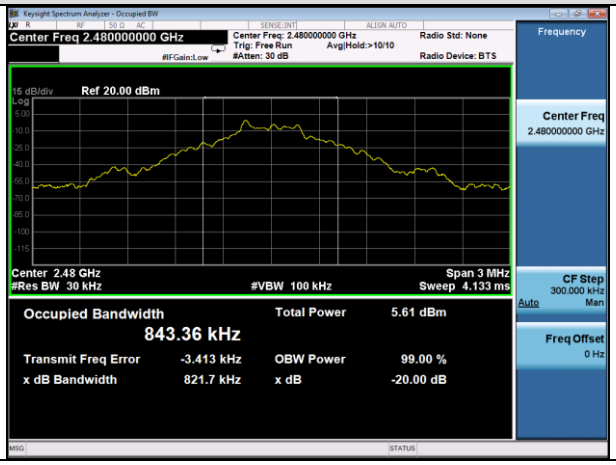
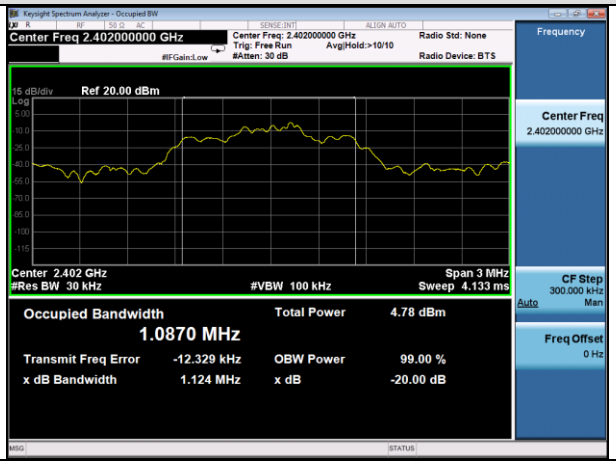


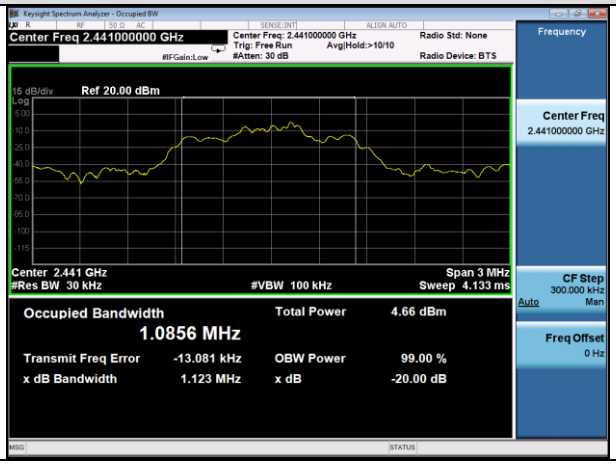
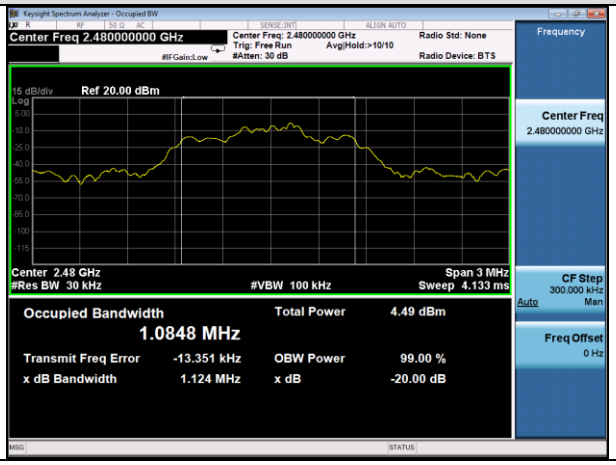
7.3. LIMITS AND MEASUREMENT RESULTS

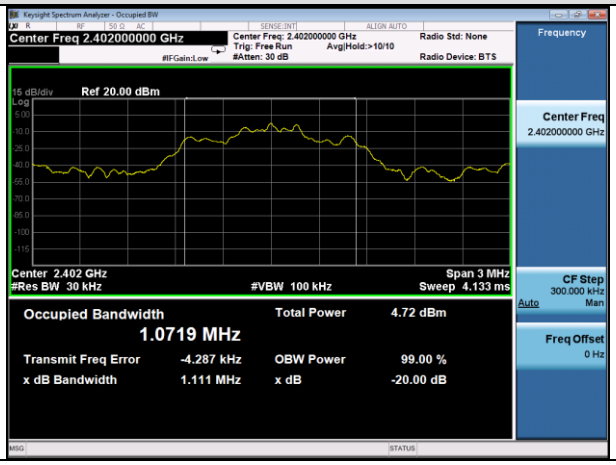
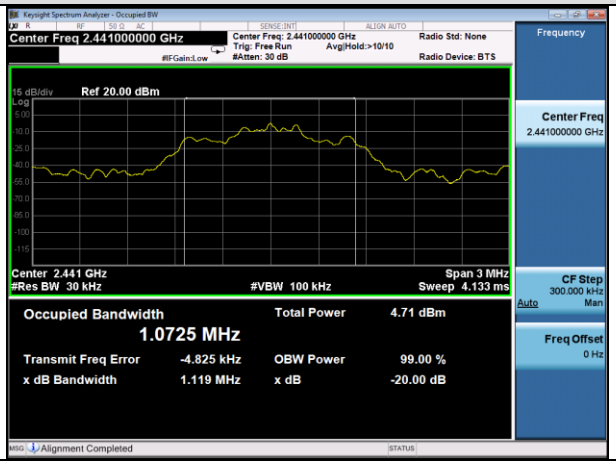
Mode	Channel.	20dB Bandwidth [KHz]	Verdict
GFSK	LCH	818.4	PASS
GFSK	MCH	820.5	PASS
GFSK	HCH	821.7	PASS
π/4DQPSK	LCH	1124	PASS
π/4DQPSK	MCH	1123	PASS
π/4DQPSK	HCH	1124	PASS
8DPSK	LCH	1111	PASS
8DPSK	MCH	1119	PASS
8DPSK	HCH	1117	PASS

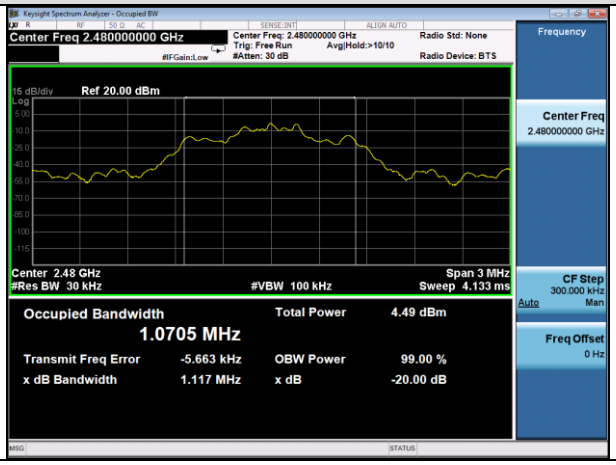
Test Graph

GFSK-LCH	GFSK-MCH
	

GFSK-HCH	π/4DQPSK-LCH
	

π/4DQPSK-MCH	π/4DQPSK-HCH
	

8DPSK-LCH	8DPSK-MCH
	

8DPSK-HCH	
	

8. CONDUCTED SPURIOUS EMISSION

8.1. 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 ≥ RBW; Sweep = auto; Detector function = peak.
4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according for compliance ANSI C63.10 (2013) requirements. Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW＞RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW＞RBW) are conform to the requirement.

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

The same as described in section 8.2

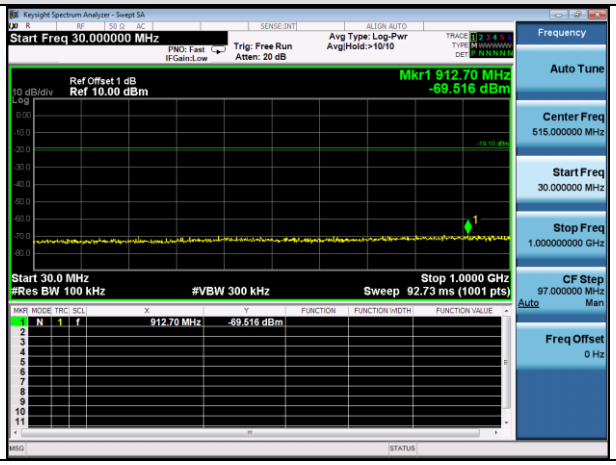
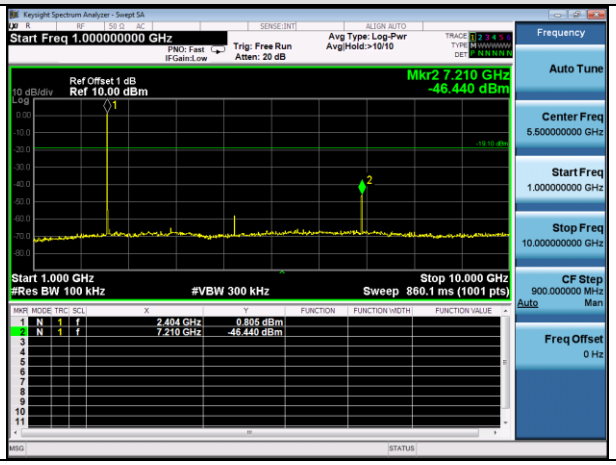
8.3. MEASUREMENT EQUIPMENT USED

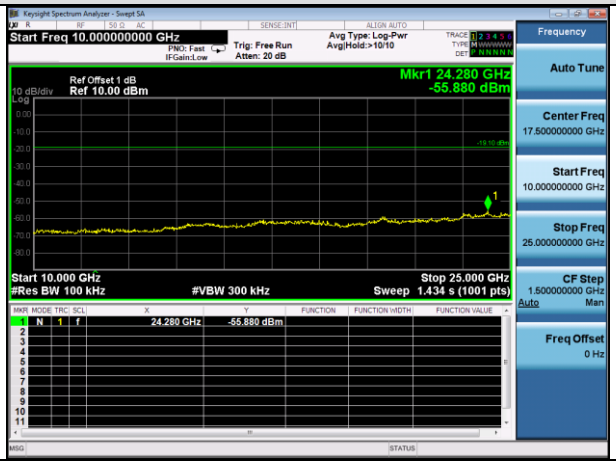
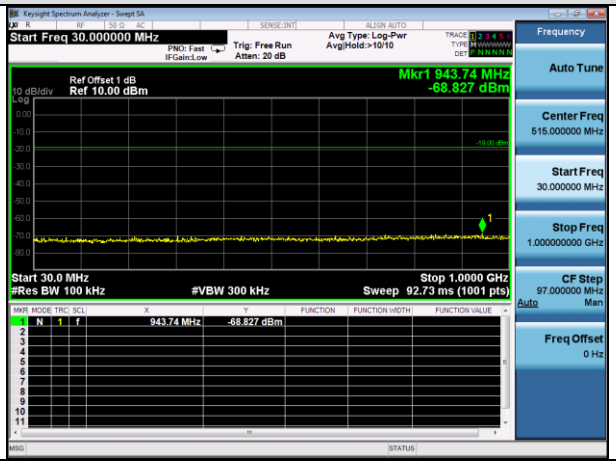
The same as described in section 6

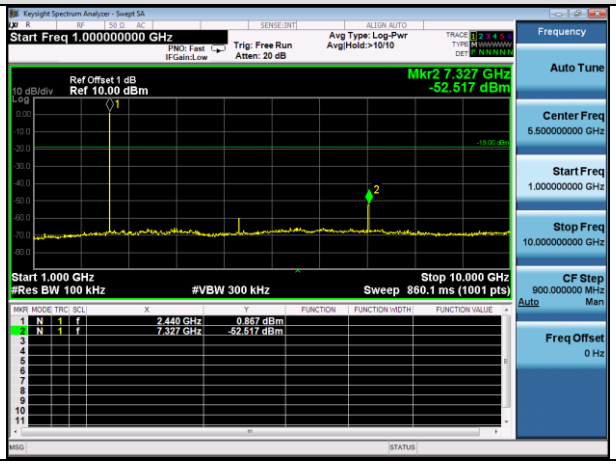
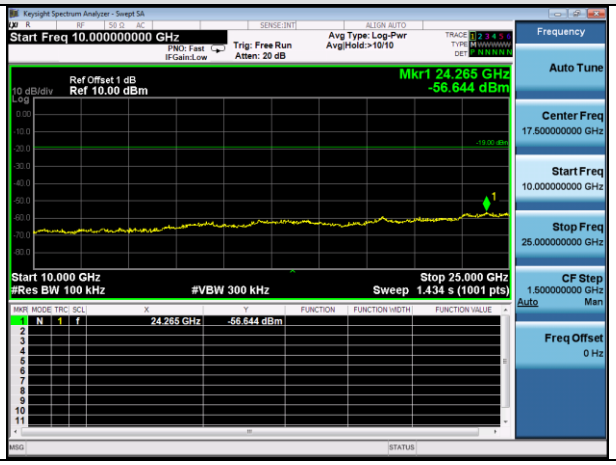
8.4. LIMITS AND MEASUREMENT RESULT

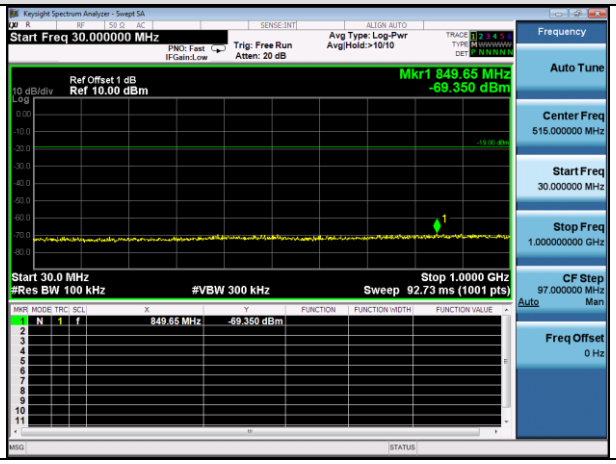
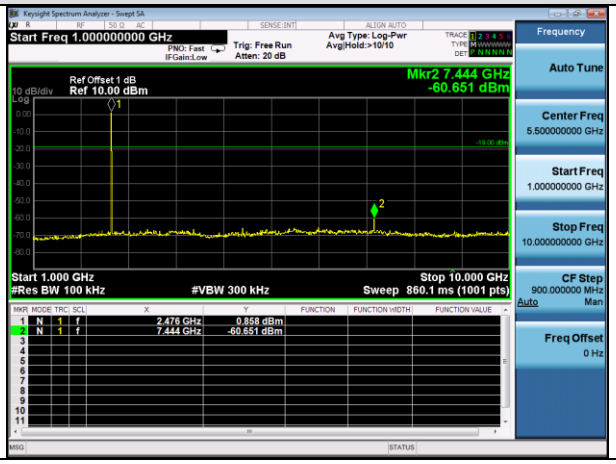
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	**Measurement Result**	
	Test Data	**Criteria**
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 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))	Refer Test Graph	PASS

Test Graph

GFSK-LCH	GFSK-LCH
	

GFSK-LCH	GFSK-MCH
	

GFSK-MCH	GFSK-MCH
	

GFSK-HCH	GFSK-HCH
	
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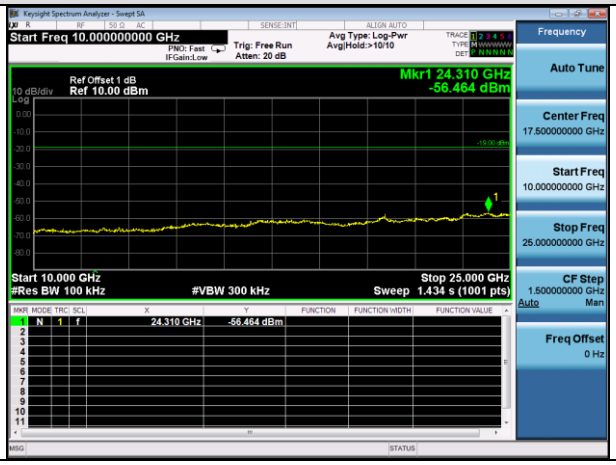
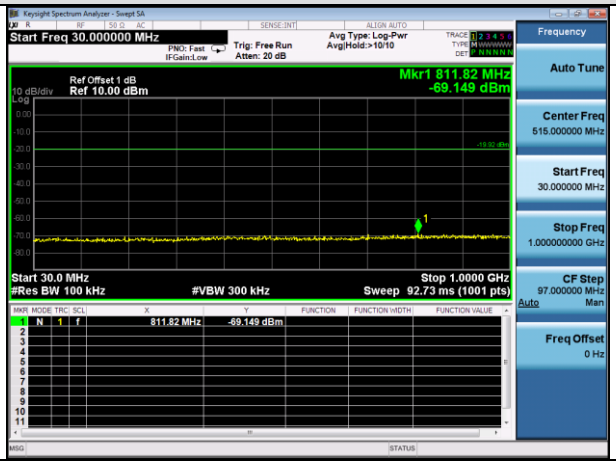
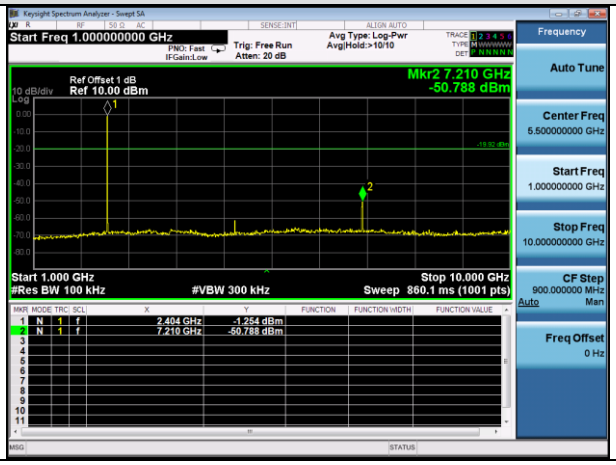
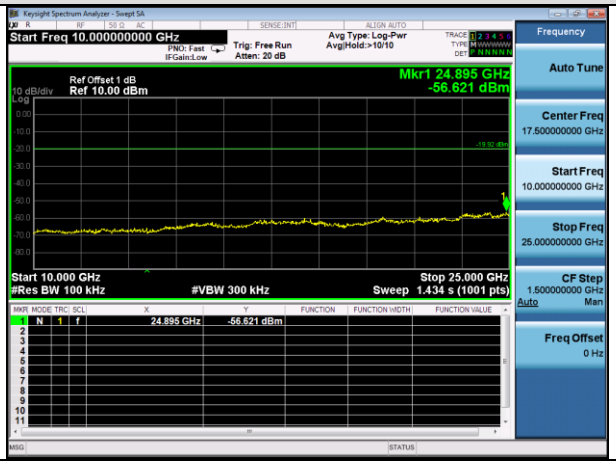
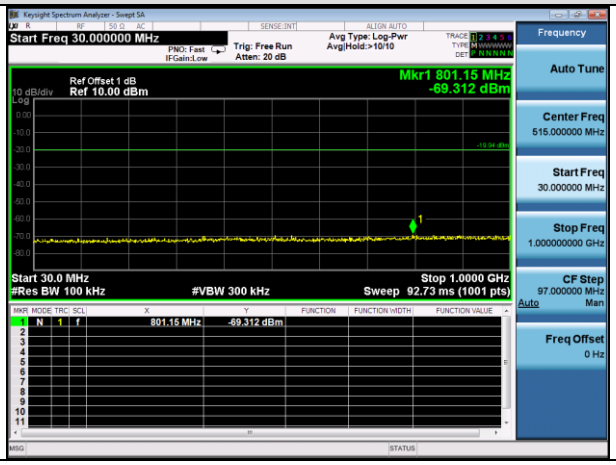
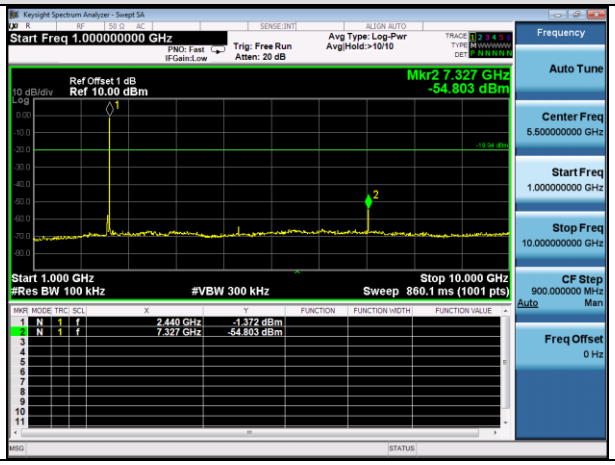
	
π/4DQPSK-LCH	π/4DQPSK-LCH
	

π/4DQPSK-MCH	π/4DQPSK-MCH
	

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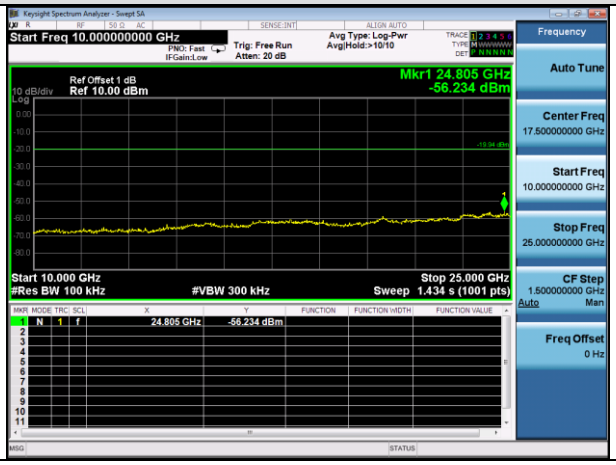	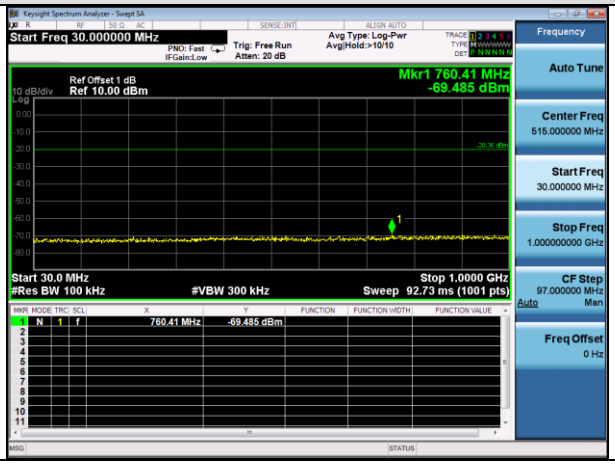

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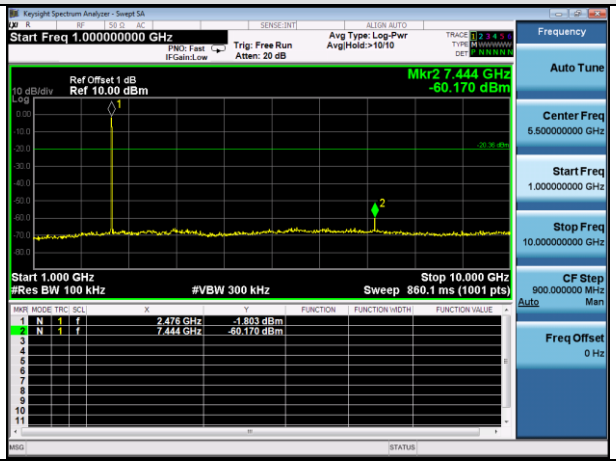	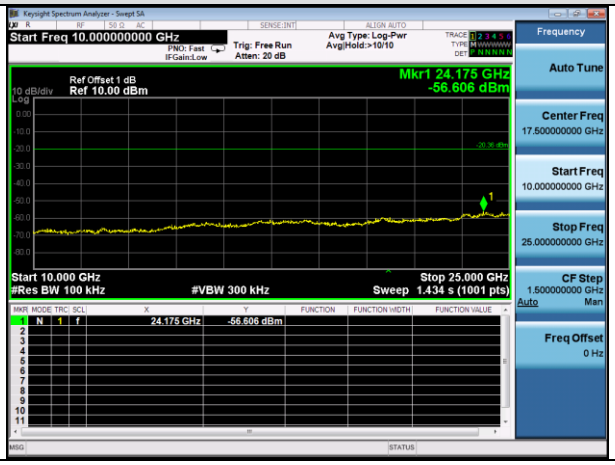

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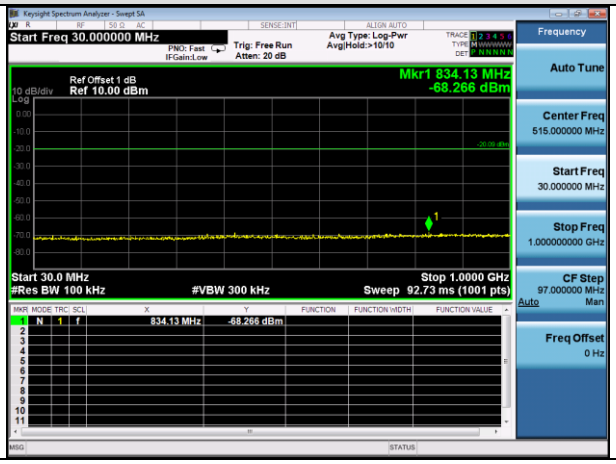	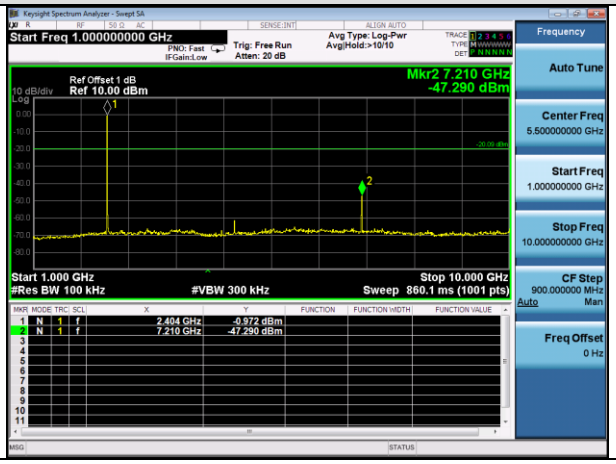
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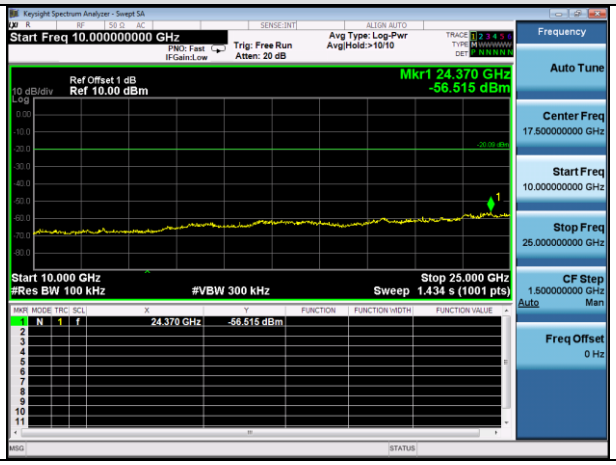	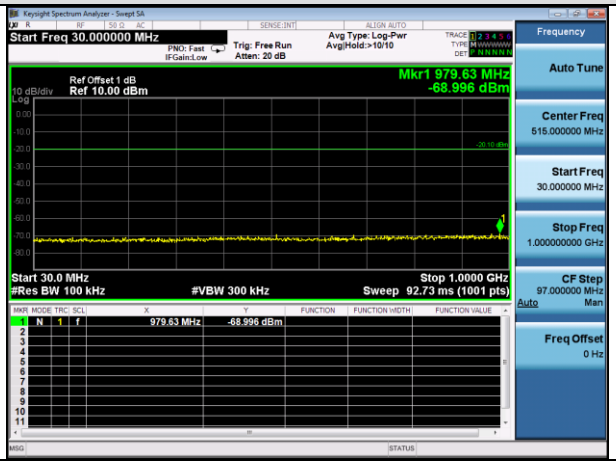
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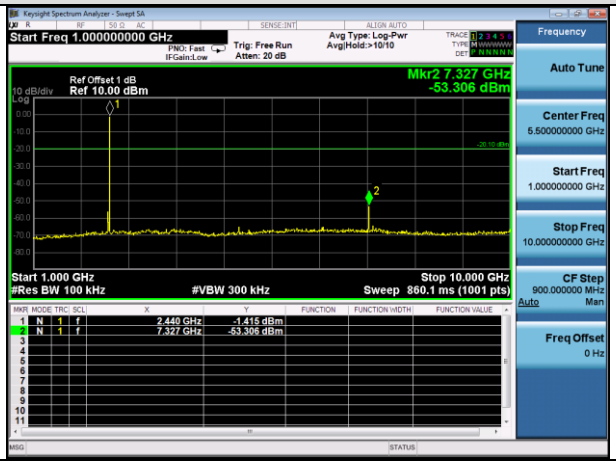	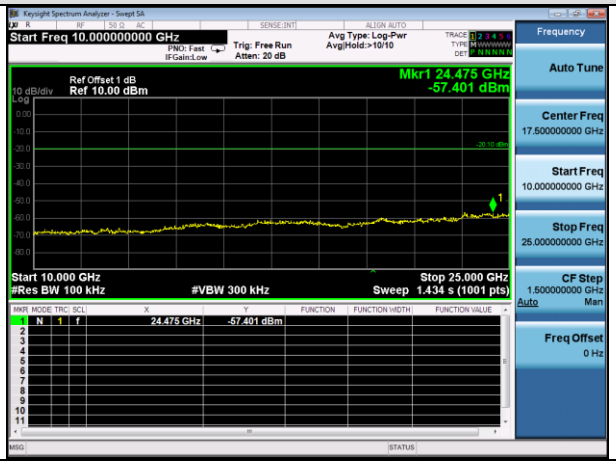

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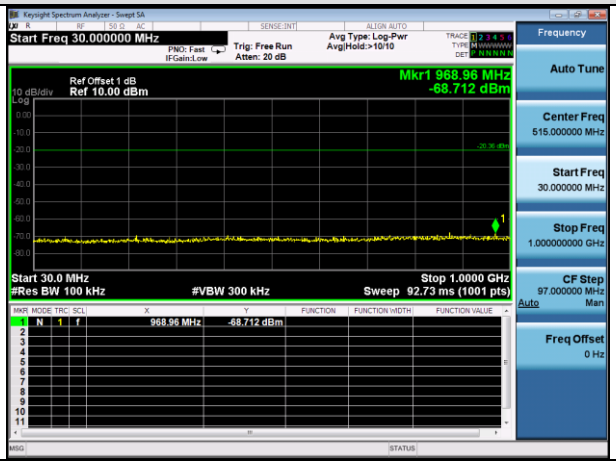	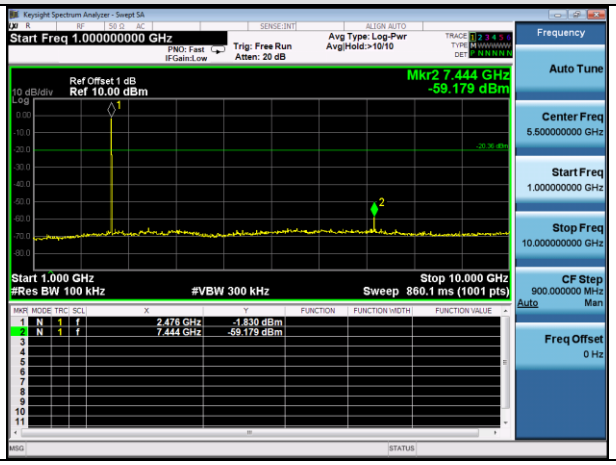

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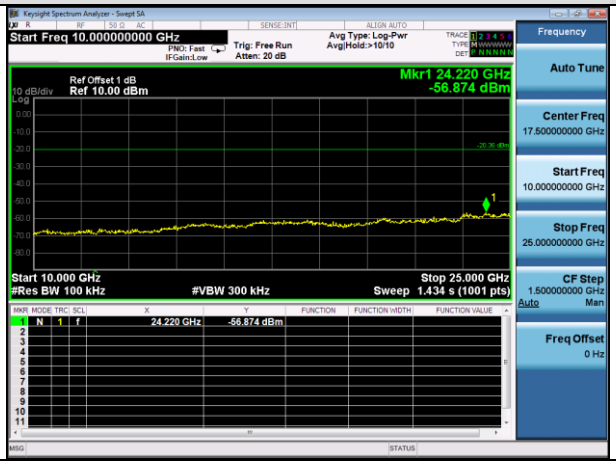
	

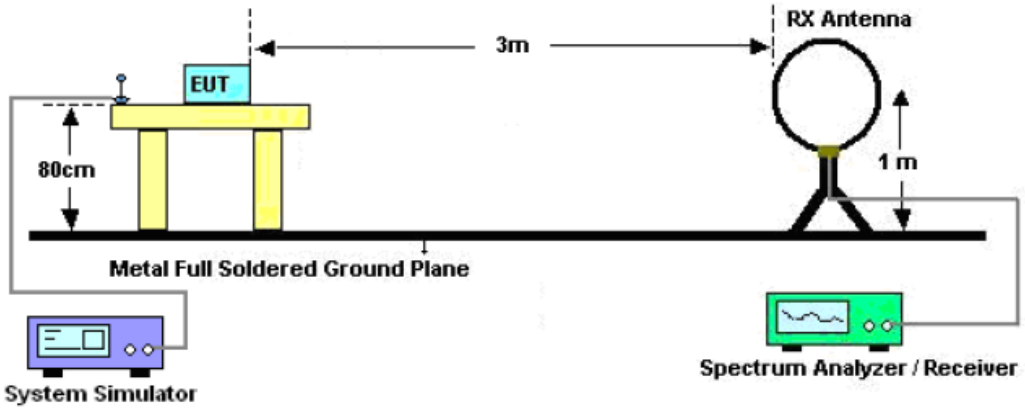
9. RADIATED EMISSION

9.1. MEASUREMENT PROCEDURE

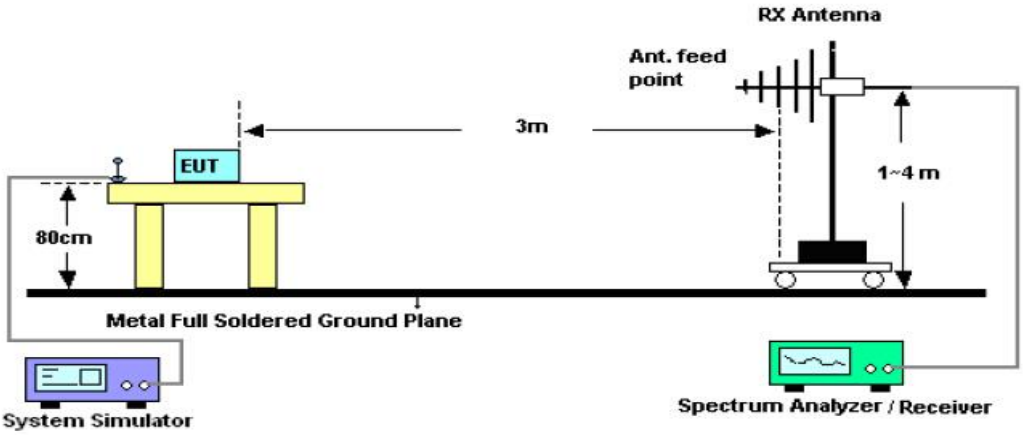
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated 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 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. 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.

9.2. TEST SETUP

RADIATED EMISSION TEST-SETUP FREQUENCY BELOW 30MHZ



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz