TEST REPORT

Application No.:	KSCR2204000503AT
FCC ID:	2AH25T6820
IC:	22621-T6820
Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Address of Applicant:	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Manufacturer:	Shanghai Sunmi Technology Co.,Ltd.
Address of Manufacturer:	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Equipment Under Test (EUT):	
EUT Name:	Smart POS system
Model No.:	T6820
Standard(s) :	47 CFR Part 15, Subpart C 15.247 RSS-247 Issue 2, February 2017 RSS-Gen Issue 5 Amendment 2 (February 2021)
Date of Receipt:	2022-05-18
Date of Test:	2022-05-30 to 2022-05-30
Date of Issue:	2022-06-23
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Eric Lin
EMC Laboratory Manager

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2022-06-23		Original

Authorized for issue by:				
		Damon zhou **Damon_Zhou/Project Engineer**		
		Eric Lin **Eric Lin/Reviewer**		

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2 Test Summary

Radio Spectrum Technical Requirement				
Item	**FCC Requirement**	**IC Requirement**	**Method**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	RSS-Gen Clause 6.8	N/A	Customer Declaration
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	RSS-247 Section 5.1(a)	N/A	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	**FCC Requirement**	**IC Requirement**	**Method**	**Result**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247(b)(1)	RSS-247 Section 5.4(b)	ANSI C63.10 (2013) Section 7.8.5	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247(a)(1)	RSS-247 Section 5.1(a)	ANSI C63.10 (2013) Section 7.8.7	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247a(1)	RSS-247 Section 5.1(b)	ANSI C63.10 (2013) Section 7.8.2	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247a(1)(iii)	RSS-247 Section 5.1(d)	ANSI C63.10 (2013) Section 7.8.3	Pass
Dwell Time	47 CFR Part 15, Subpart C 15.247a(1)(iii)	RSS-247 Section 5.1(d)	ANSI C63.10 (2013) Section 7.8.4	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Section 5.5	ANSI C63.10 (2013) Section 7.8.6	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247(d)	RSS-247 Section 5.5	ANSI C63.10 (2013) Section 7.8.8	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.205 & 15.209	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.10.5	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.205 & 15.209	RSS-247 Section 3.3 & RSS-Gen Section 8.9	ANSI C63.10 (2013) Section 6.4,6.5,6.6	Pass
99% Bandwidth	-	RSS-Gen Section 6.7	ANSI C63.10 Section 6.9.3	Pass

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Note:

Products are classified as Scanner version and non- Scanner version. they are the identical in electrical and electronic characters.

There are two different supplies. The differences of supply mainly include the following: LCM, Camera, loudspeaker, PCB, button cell, rear camera lens, scanner lens.

SKU1 stand for Scanner version with the first supplier.

SKU2 stand for Scanner version with the second supplier.

SKU3 stand for non- Scanner version the first supplier.

SKU4 stand for non- Scanner version the second supplier.

After Pre-scan test. Only SKU1 was tested since their differences.

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3 Contents

Page

1 COVER PAGE 1

2 TEST SUMMARY 3

3 CONTENTS 5

4 GENERAL INFORMATION 7

4.1 DETAILS OF E.U.T. 7
4.2 POWER LEVEL SETTING USING IN TEST: 8
4.3 DESCRIPTION OF SUPPORT UNITS 8
4.4 MEASUREMENT UNCERTAINTY 8
4.5 TEST LOCATION 9
4.6 TEST FACILITY 9
4.7 DEVIATION FROM STANDARDS 9
4.8 ABNORMALITIES FROM STANDARD CONDITIONS 10

5 EQUIPMENT LIST 11

6 RADIO SPECTRUM TECHNICAL REQUIREMENT 13

6.1 ANTENNA REQUIREMENT 13
6.1.1 Test Requirement: 13
6.1.2 Conclusion 13
6.2 OTHER REQUIREMENTS FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM HOPPING SEQUENCE 14
6.2.1 Test Requirement: 14
6.2.2 Conclusion 14

7 RADIO SPECTRUM MATTER TEST RESULTS 16

7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) 16
7.1.1 E.U.T. Operation 16
7.1.2 Test Mode Description 16
7.1.3 Test Setup Diagram 17
7.1.4 Measurement Procedure and Data 17
7.2 CONDUCTED PEAK OUTPUT POWER 20
7.2.1 E.U.T. Operation 20
7.2.2 Test Mode Description 20
7.2.3 Test Setup Diagram 21
7.2.4 Measurement Procedure and Data 21
7.3 20DB BANDWIDTH 22
7.3.1 E.U.T. Operation 22
7.3.2 Test Mode Description 22
7.3.3 Test Setup Diagram 22
7.3.4 Measurement Procedure and Data 22
7.4 CARRIER FREQUENCIES SEPARATION 23
7.4.1 E.U.T. Operation 23
7.4.2 Test Mode Description 23
7.4.3 Test Setup Diagram 23

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7.4.4 Measurement Procedure and Data....23
7.5 HOPPING CHANNEL NUMBER....24
7.5.1 E.U.T. Operation....24
7.5.2 Test Mode Description....24
7.5.3 Test Setup Diagram....24
7.5.4 Measurement Procedure and Data....25
7.6 DWELL TIME....26
7.6.1 E.U.T. Operation....26
7.6.2 Test Mode Description....26
7.6.3 Test Setup Diagram....26
7.6.4 Measurement Procedure and Data....26
7.7 CONDUCTED BAND EDGES MEASUREMENT....28
7.7.1 E.U.T. Operation....28
7.7.2 Test Mode Description....28
7.7.3 Test Setup Diagram....29
7.7.4 Measurement Procedure and Data....29
7.8 CONDUCTED SPURIOUS EMISSIONS....30
7.8.1 E.U.T. Operation....30
7.8.2 Test Mode Description....30
7.8.3 Test Setup Diagram....30
7.8.4 Measurement Procedure and Data....31
7.9 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS....32
7.9.1 E.U.T. Operation....32
7.9.2 Test Mode Description....32
7.9.3 Test Setup Diagram....33
7.9.4 Measurement Procedure and Data....33
7.10 RADIATED SPURIOUS EMISSIONS BELOW 1GHZ....46
7.10.1 E.U.T. Operation....46
7.10.2 Test Mode Description....46
7.10.3 Test Setup Diagram....47
7.10.4 Measurement Procedure and Data....47
7.11 RADIATED SPURIOUS EMISSIONS ABOVE 1GHZ....50
7.11.1 E.U.T. Operation....50
7.11.2 Test Mode Description....50
7.11.3 Test Setup Diagram....50
7.11.4 Measurement Procedure and Data....51
7.12 99% BANDWIDTH....70
7.12.1 E.U.T. Operation....70
7.12.2 Test Mode Description....70
7.12.3 Test Setup Diagram....70
7.12.4 Measurement Procedure and Data....70

8 TEST SETUP PHOTO....71

9 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS)....71

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 7.2V by Rechargeable Li-ion Battery charged by Adapter Battery Model: LKPA Nominal voltage:7.2V Limited charge voltage:8.4V Rated capacity:2500mAh/18Wh Typical capacity:2600mAh/18.72Wh Adapter Model 1: UC13US INPUT:100-240V,50/60Hz,0.35A OUTPUT:5V,2A Adapter Model 2: UC11US INPUT:100-240V,50/60Hz,0.2A OUTPUT:5V,1A Adapter Model 3: TPA-46B050100UU INPUT:100-240V,50/60Hz,0.2A OUTPUT:5V,1A Adapter Model 4: TPA-23A050200UU01 INPUT:100-240V,50/60Hz,0.3A OUTPUT:5V,2A
Test Voltage:	DC 7.2V Remark: (Only AC 120V 60Hz by AC adapter for Conducted Emission test)
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 Dual mode
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Antenna Type:	PIFA Antenna
Antenna Gain:	1.4dBi (Provided by manufacturer)
Firmware Version:	SP6228A_V11_20220501_sunmi
Serial Number:	1T247ESJQG004Q5

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4.2 Power level setting using in test:

Channel	DH5	2DH5	3DH5
0	Default	Default	Default
39	Default	Default	Default
78	Default	Default	Default

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Notebook	Lenovo	--	--

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

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

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4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1.SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).

2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC (Designation Number: CN1172)

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

• ISED (CAB identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.7 Deviation from Standards

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4.8 Abnormalities from Standard Conditions

None

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5 Equipment List

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals (150kHz-30MHz)						
1	EMI Test Receive	R&S	ESCI	KS301101	01/22/2022	01/21/2023
2	LISN	R&S	ENV216	KS301197	01/22/2022	01/21/2023
3	LISN	Schwarzbeck	NNLK 8129	KS301091	01/22/2022	01/21/2023
4	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	01/22/2022	01/21/2023
5	CE test Cable	Thermax	/	CZ301102	11/14/2021	11/13/2022
6	Test Software	Farad	EZ-EMC	/	N.C.R	N.C.R
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	10/11/2021	10/10/2022
2	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	09/17/2021	09/16/2022
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/22/2022	01/21/2023
4	Signal Generator	R&S	SMW200A	KSEM020-1	10/12/2021	10/11/2022
5	Signal Generator	Agilent	N5182A	KUS2001M001-1	08/27/2021	08/26/2022
6	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	09/23/2021	09/22/2022
7	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	04/01/2022	03/31/2023
8	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	10/12/2021	10/11/2022
9	Switcher	CCSRF	FY562	KUS2001M001-3	10/12/2021	10/11/2022
10	AC Power Source	EXTECH	6605	KS301178	N.C.R	N.C.R
11	DC Power Supply	Aglient	E3632A	KS301180	N.C.R	N.C.R
12	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	01/16/2022	01/15/2023
13	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	04/01/2021	03/31/2023
14	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	04/01/2021	03/31/2023
15	Software	BST	TST-PASS	/	N/A	N/A
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	10/11/2021	10/10/2022
2	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	04/01/2022	03/31/2023
3	Signal Generator	Agilent	E8257C	KS301066	10/18/2021	10/17/2022
4	Loop Antenna	COM-POWER	AL-130R	KUS1806E001	04/13/2021	04/12/2023
5	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E005	06/29/2021	06/28/2023
6	Bilog Antenna	SCHWARZBECK	VULB9160	CZ301016	04/13/2021	04/12/2024
7	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	10/26/2020	10/25/2022
8	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	KS301186	02/22/2021	02/21/2023

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9	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	03/22/2022	03/21/2023
10	Amplifier(30MHz~18GHz)	PANSHAN TECHNOLOGY	LNA:1~18G	KSEM010-1	01/22/2022	01/21/2023
11	Amplifier(18~40GHz)	COM-POWER	PAM-840A	KUS1710E001	01/22/2022	01/21/2023
12	RE Test Cable	REBES MICROWAVE	/	CZ301097	11/14/2021	11/13/2022
13	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	01/04/2022	31/03/2023
14	Software	Faratronic	EZ_EMC-v 3A1	/	N/A	N/A

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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is PIFA antenna on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.4 dBi.

Antenna location: Refer to Appendix (Internal Photos).

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6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

> Number of shift register stages: 9

> Length of pseudo-random sequence: 29 -1 = 511 bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:

Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the

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occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

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7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	TX_non-Hop mode_Keep the EUT with adapter 1 in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
	01	TX_non-Hop mode_Keep the EUT with adapter 2 in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
	02	TX_non-Hop mode_Keep the EUT with adapter 3 in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
	03	TX_non-Hop mode_Keep the EUT with adapter 4 in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final	03	TX_non-Hop mode_Keep the EUT with adapter 4 in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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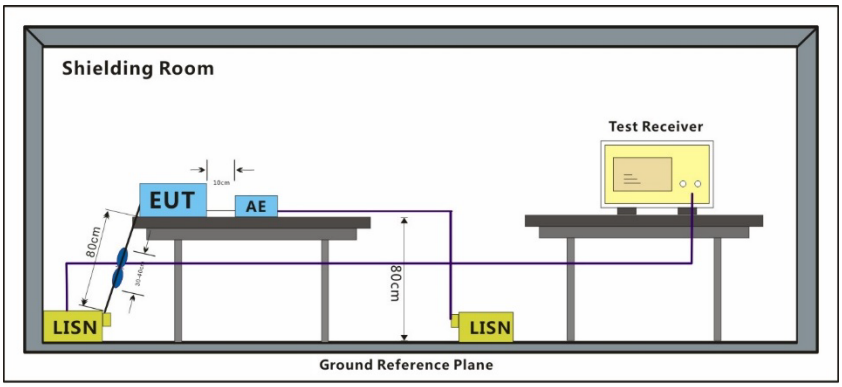
7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor

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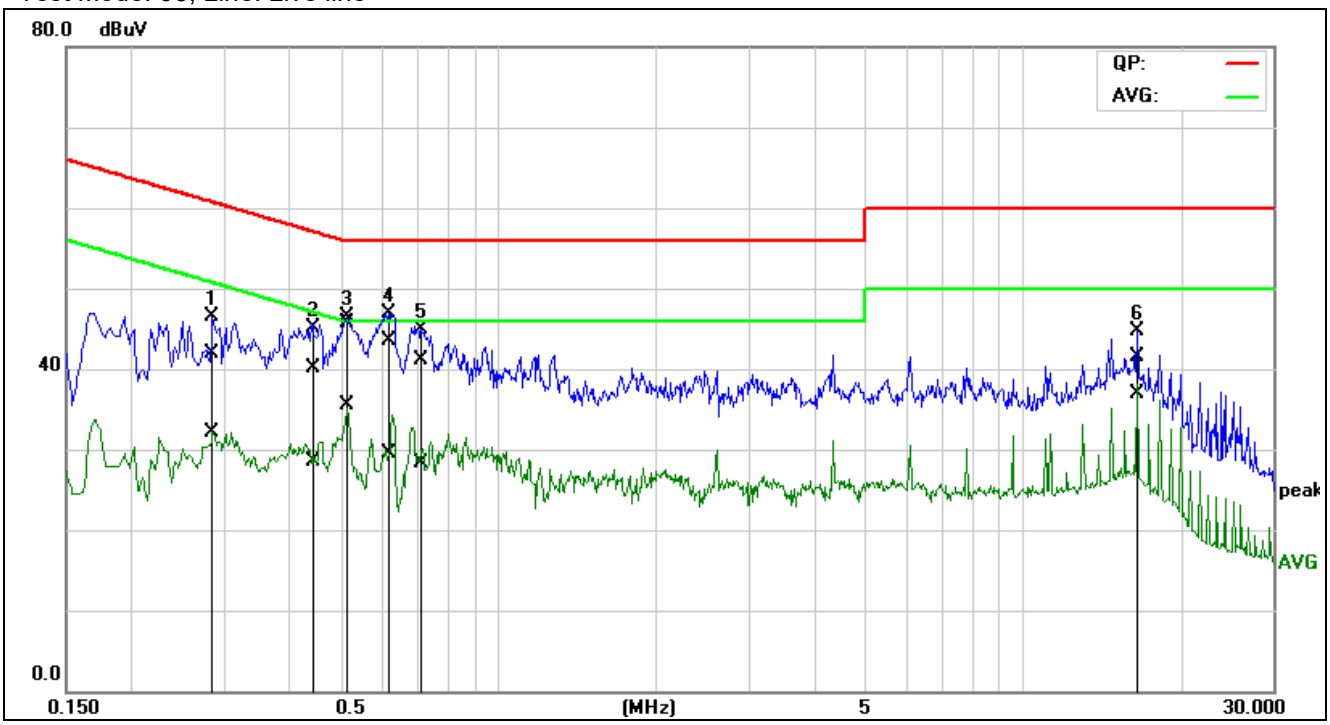
Test Mode: 03; Line: Live line



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.2838	22.39	12.68	19.51	41.90	32.19	60.70	50.70	-18.80	-18.51	Pass
2	0.4448	20.62	8.87	19.55	40.17	28.42	56.97	46.97	-16.80	-18.55	Pass
3*	0.5150	26.11	16.04	19.56	45.67	35.60	56.00	46.00	-10.33	-10.40	Pass
4	0.6184	23.95	9.87	19.57	43.52	29.44	56.00	46.00	-12.48	-16.56	Pass
5	0.7012	21.52	8.75	19.57	41.09	28.32	56.00	46.00	-14.91	-17.68	Pass
6	16.5477	21.22	16.56	20.25	41.47	36.81	60.00	50.00	-18.53	-13.19	Pass

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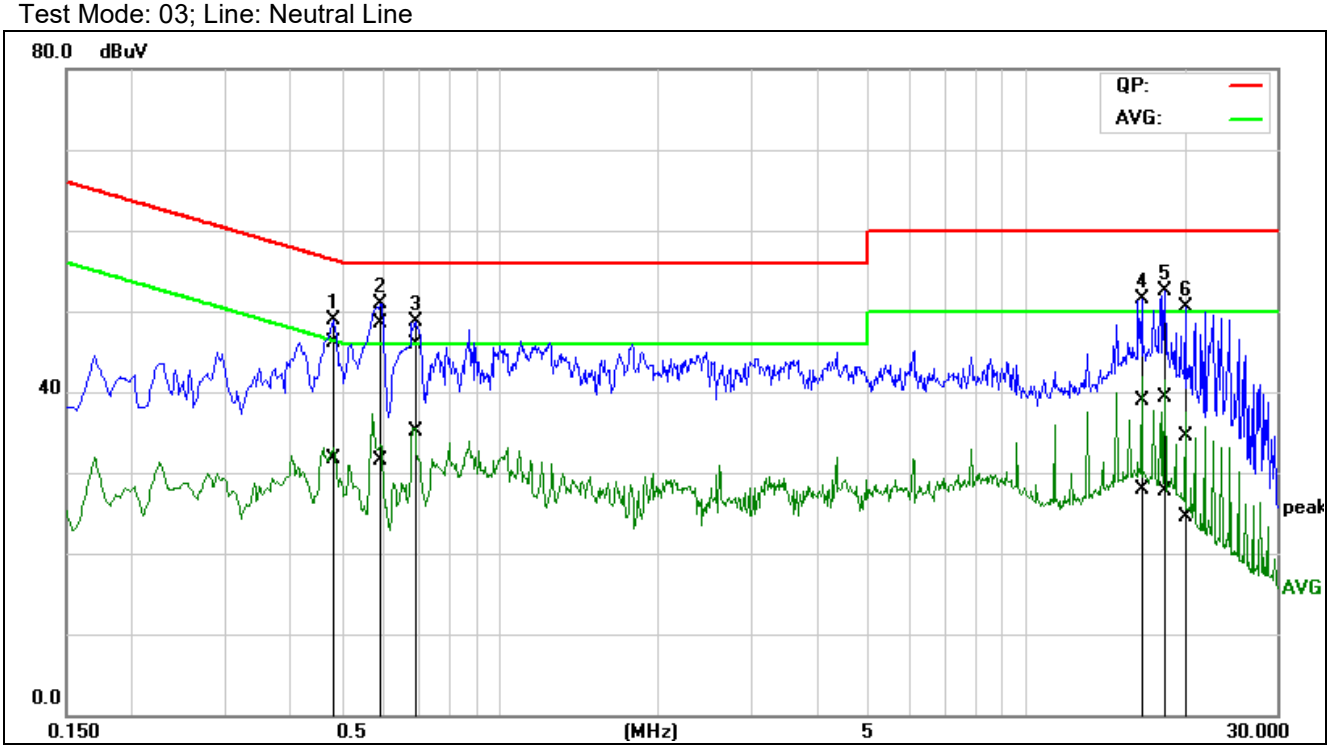
Test Mode: 03; Line: Neutral Line



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.4839	26.50	12.12	19.56	46.06	31.68	56.27	46.27	-10.21	-14.59	Pass
2*	0.5952	29.02	12.04	19.56	48.58	31.60	56.00	46.00	-7.42	-14.40	Pass
3	0.6902	26.44	15.63	19.56	46.00	35.19	56.00	46.00	-10.00	-10.81	Pass
4	16.5617	18.70	7.66	20.25	38.95	27.91	60.00	50.00	-21.05	-22.09	Pass
5	18.3764	19.06	7.47	20.31	39.37	27.78	60.00	50.00	-20.63	-22.22	Pass
6	20.1076	14.13	4.21	20.36	34.49	24.57	60.00	50.00	-25.51	-25.43	Pass

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7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.5

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 45 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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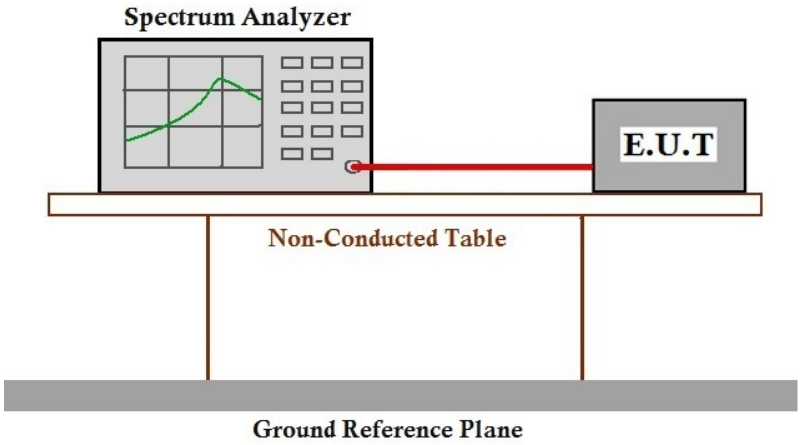
7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

The detailed test data see: Appendix B for KSCR220400050302

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7.3 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.7

7.3.1 E.U.T. Operation

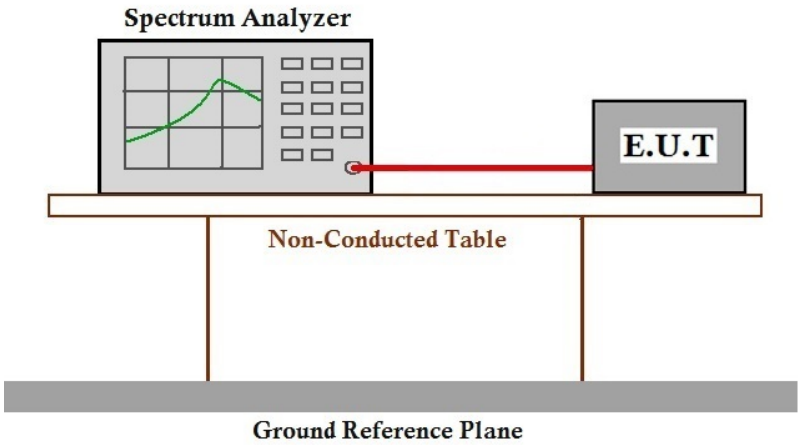
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

The detailed test data see: Appendix B for KSCR220400050302

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7.4 Carrier Frequencies Separation

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)

Test Method: ANSI C63.10 (2013) Section 7.8.2

Limit:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

7.4.1 E.U.T. Operation

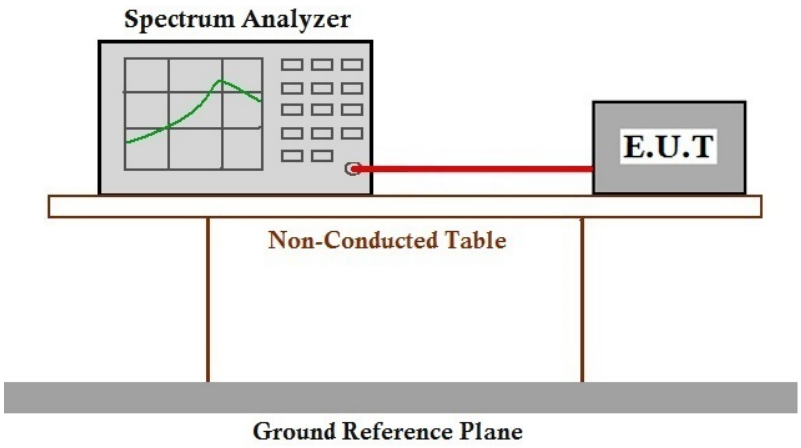
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	05	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

The detailed test data see: Appendix B for KSCR220400050302

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7.5 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2013) Section 7.8.3

Limit:

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

7.5.1 E.U.T. Operation

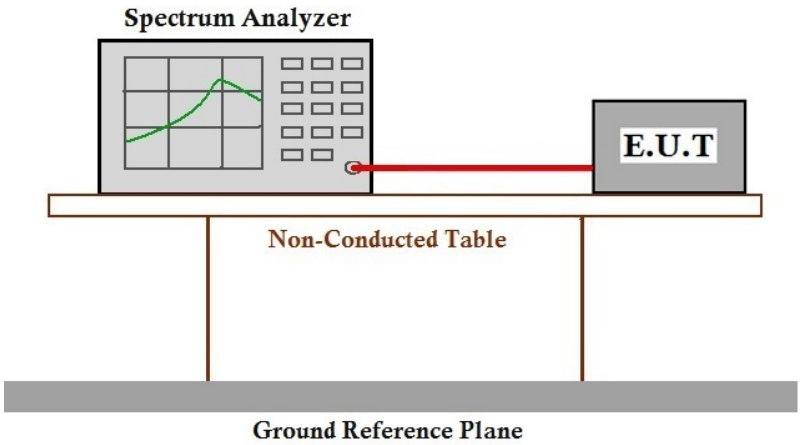
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	05	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram



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7.5.4 Measurement Procedure and Data

The detailed test data see: Appendix B for KSCR220400050302

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7.6 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)

Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

7.6.1 E.U.T. Operation

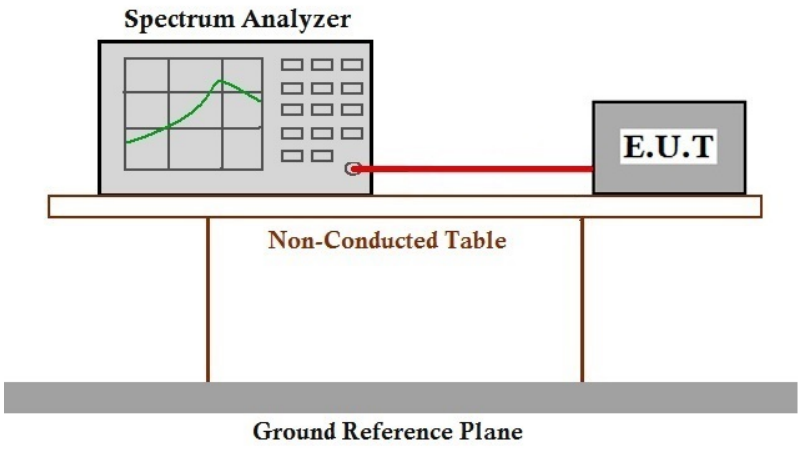
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	05	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

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The detailed test data see: Appendix B for KSCR220400050302

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7.7 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 7.8.6

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated 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) (see §15.205(c).

7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	05	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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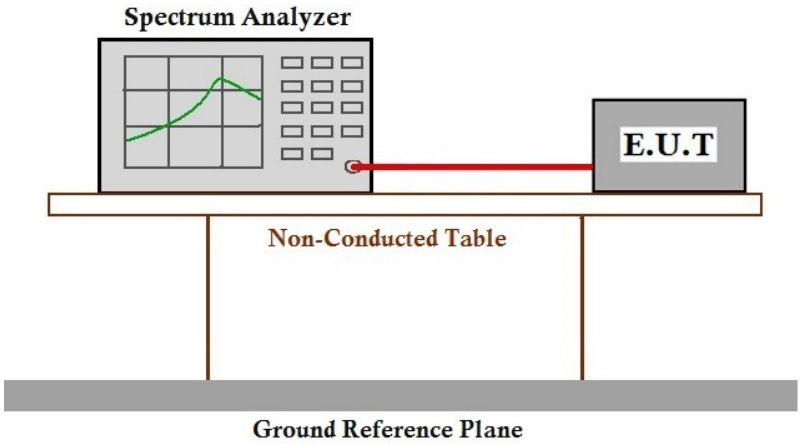
7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

The detailed test data see: Appendix B for KSCR220400050302

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7.8 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 7.8.8

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated 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) (see §15.205(c).

7.8.1 E.U.T. Operation

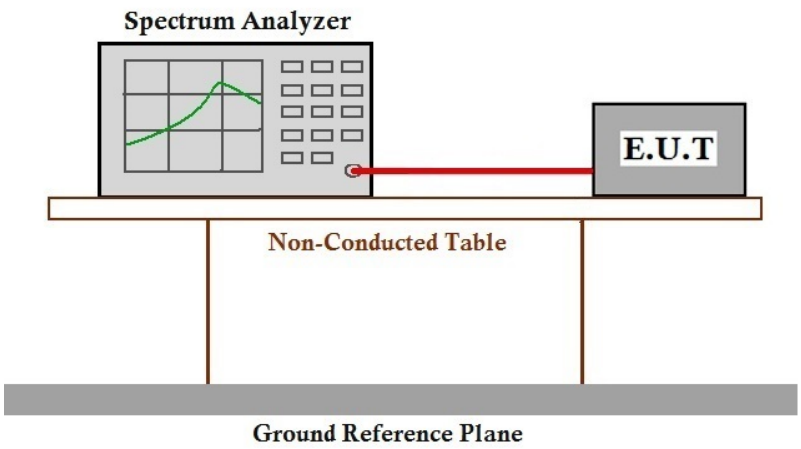
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



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7.8.4 Measurement Procedure and Data

The detailed test data see: Appendix B for KSCR220400050302

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7.9 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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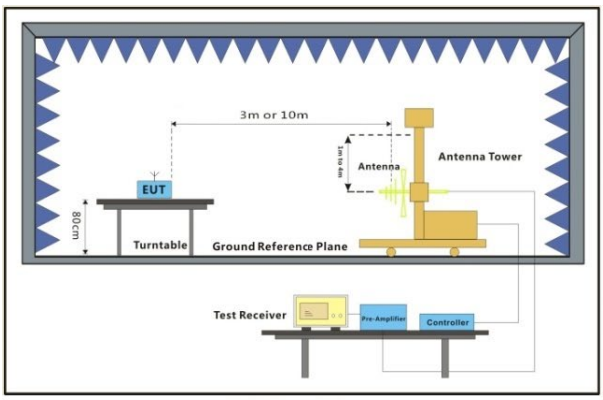
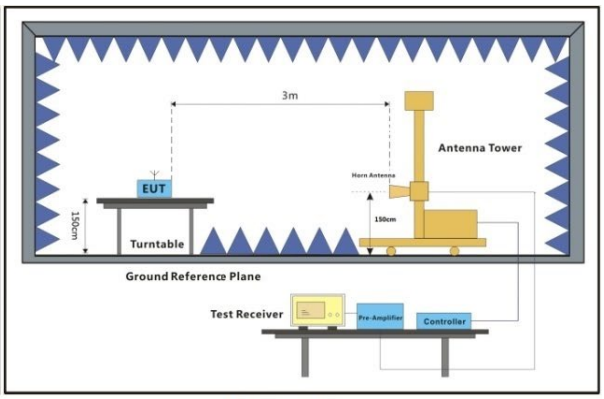
7.9.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.9.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

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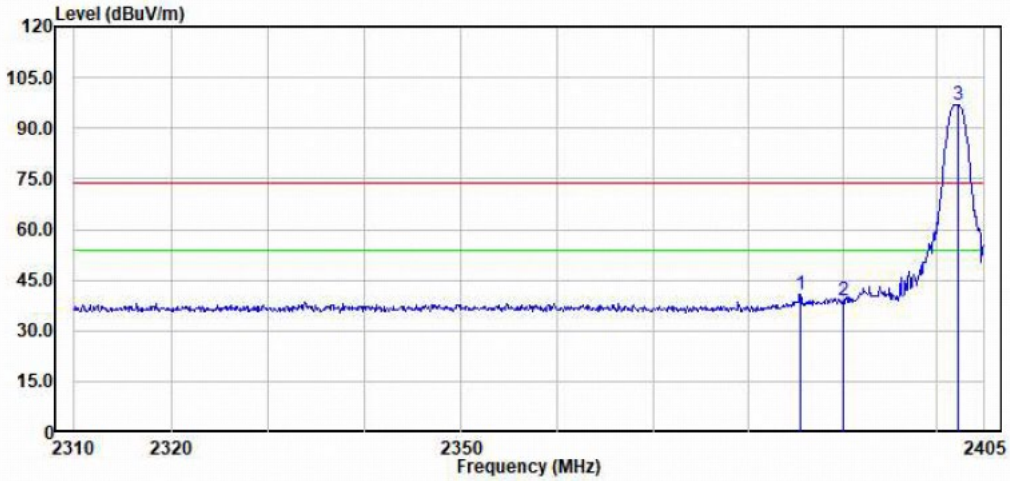
Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2385.525	5.69	26.72	49.75	58.07	40.73	74.00	-33.27	Peak
2	2390.000	5.69	26.73	49.74	56.15	38.83	74.00	-35.17	Peak
3	2402.245	5.71	26.75	49.73	114.22	96.95	74.00	22.95	Peak

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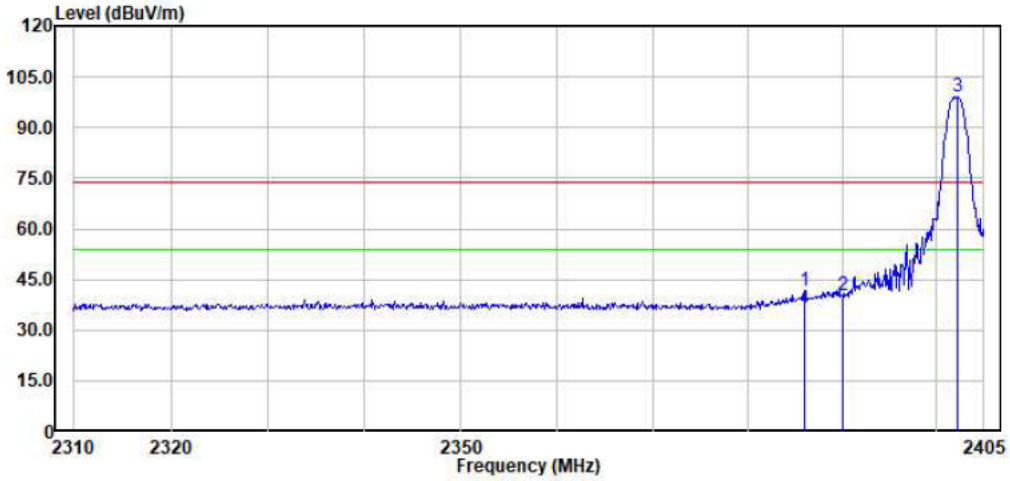
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2386.000	5.69	26.72	49.75	59.19	41.85	74.00	-32.15	Peak
2	2390.000	5.69	26.73	49.74	57.52	40.20	74.00	-33.80	Peak
3	2402.150	5.71	26.75	49.73	116.27	99.00	74.00	25.00	Peak

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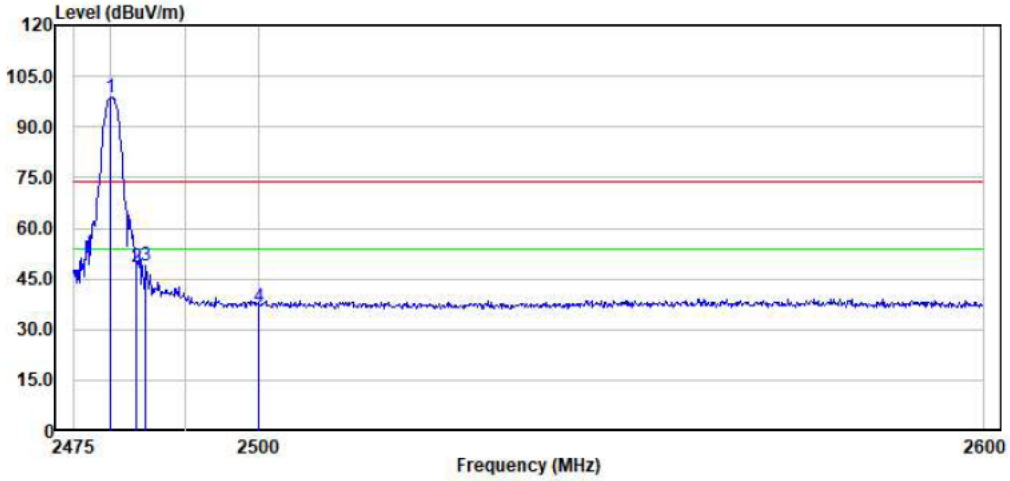
Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2480.000	5.82	27.03	49.66	115.34	98.53	74.00	24.53	Peak
2	2483.500	5.83	27.04	49.66	65.15	48.36	74.00	-25.64	Peak
3	2484.625	5.83	27.04	49.66	65.60	48.81	74.00	-25.19	Peak
4	2500.000	5.85	27.10	49.65	53.47	36.77	74.00	-37.23	Peak

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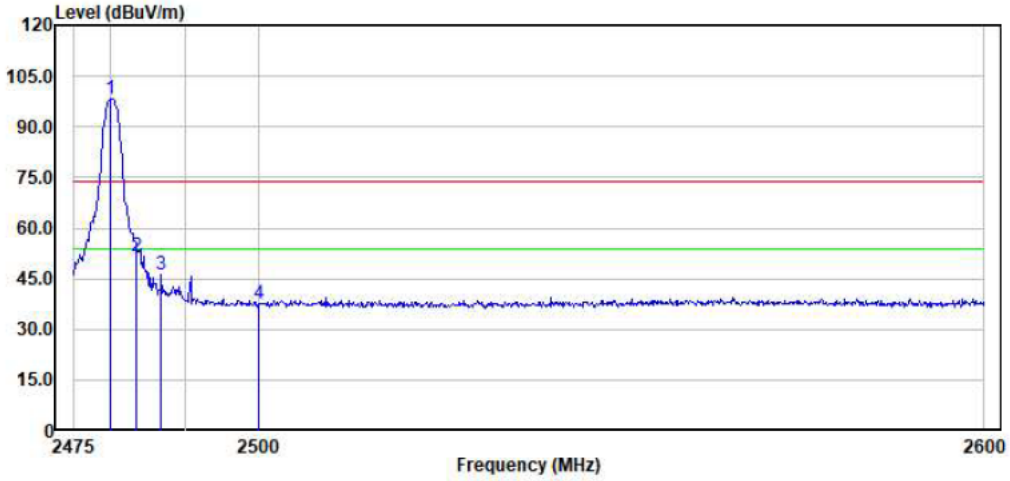
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2480.000	5.82	27.03	49.66	114.98	98.17	74.00	24.17	Peak
2	2483.500	5.83	27.04	49.66	68.60	51.81	74.00	-22.19	Peak
3	2486.750	5.83	27.05	49.66	63.01	46.23	74.00	-27.77	Peak
4	2500.000	5.85	27.10	49.65	54.18	37.48	74.00	-36.52	Peak

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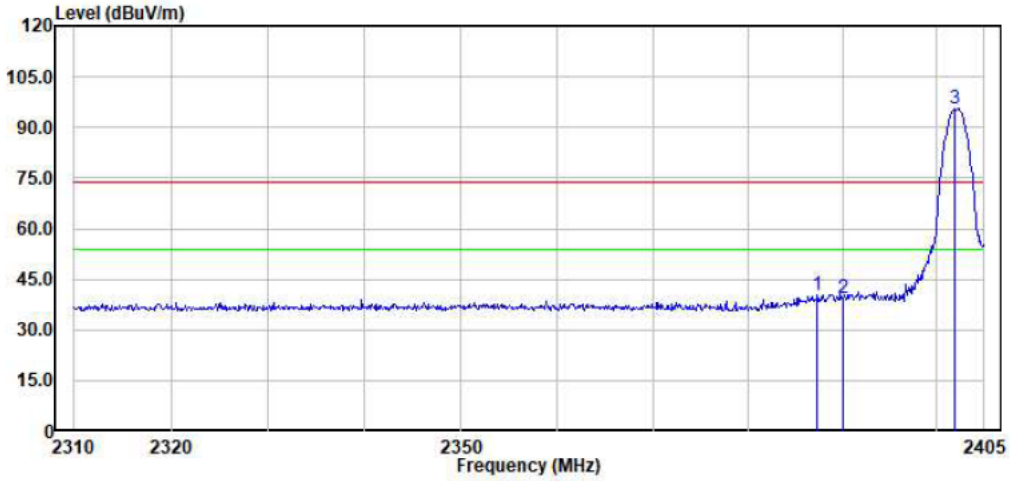
Test Mode: 04; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2387.330	5.69	26.72	49.75	57.45	40.11	74.00	-33.89	Peak
2	2390.000	5.69	26.73	49.74	56.79	39.47	74.00	-34.53	Peak
3	2401.960	5.71	26.75	49.73	112.82	95.55	74.00	21.55	Peak

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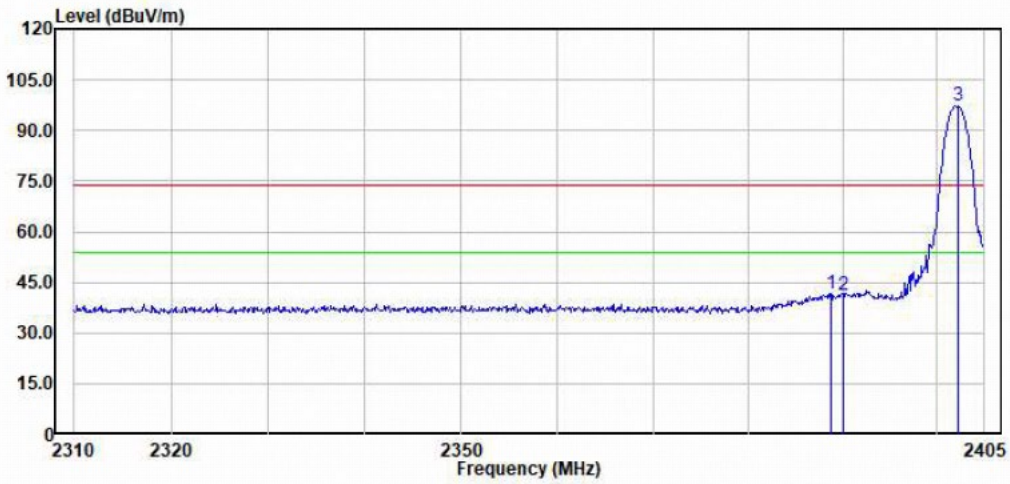
Test Mode: 04; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2388.755	5.69	26.73	49.74	59.14	41.82	74.00	-32.18	Peak
2	2390.000	5.69	26.73	49.74	58.73	41.41	74.00	-32.59	Peak
3	2402.245	5.71	26.75	49.73	114.52	97.25	74.00	23.25	Peak

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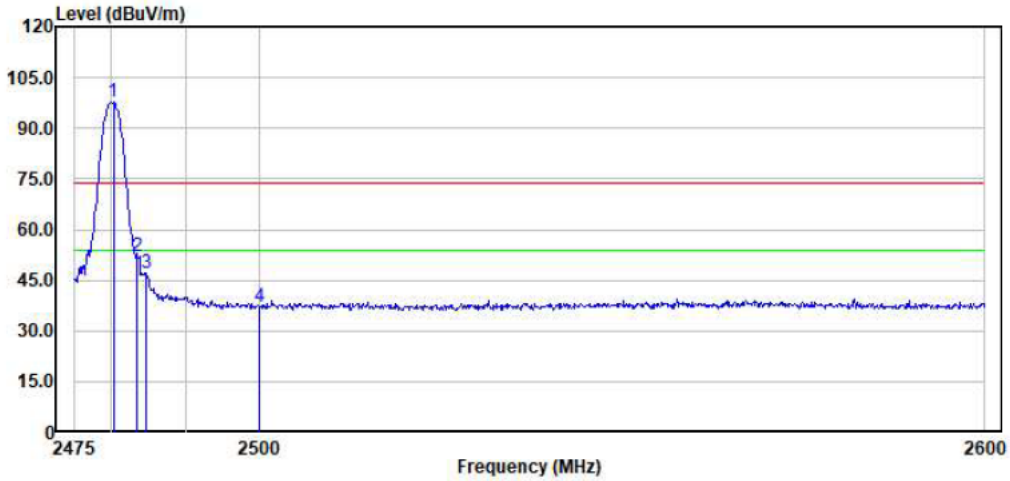
Test Mode: 04; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2480.250	5.82	27.03	49.66	114.65	97.84	74.00	23.84	Peak
2	2483.500	5.83	27.04	49.66	68.67	51.88	74.00	-22.12	Peak
3	2484.625	5.83	27.04	49.66	63.68	46.89	74.00	-27.11	Peak
4	2500.000	5.85	27.10	49.65	53.80	37.10	74.00	-36.90	Peak

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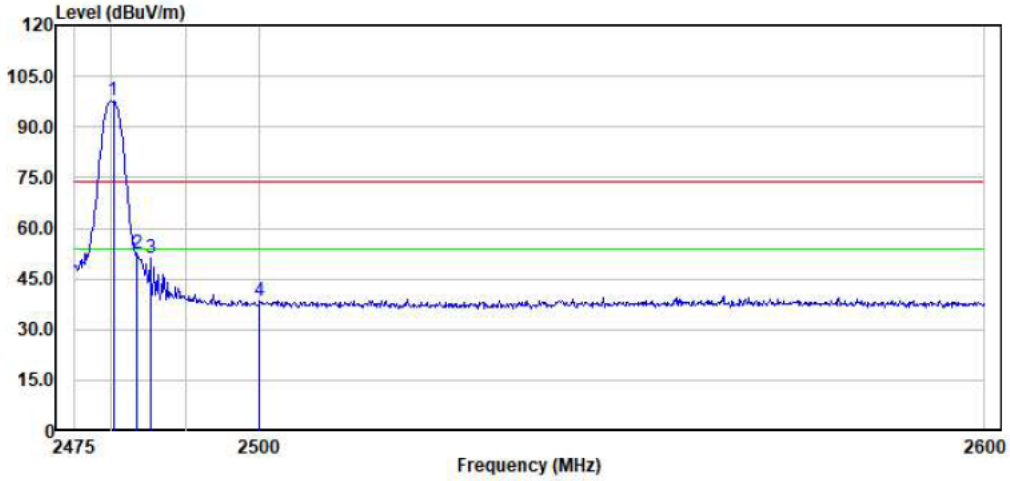
Test Mode: 04; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2480.250	5.82	27.03	49.66	114.66	97.85	74.00	23.85	Peak
2	2483.500	5.83	27.04	49.66	69.10	52.31	74.00	-21.69	Peak
3	2485.250	5.83	27.05	49.66	67.87	51.09	74.00	-22.91	Peak
4	2500.000	5.85	27.10	49.65	55.37	38.67	74.00	-35.33	Peak

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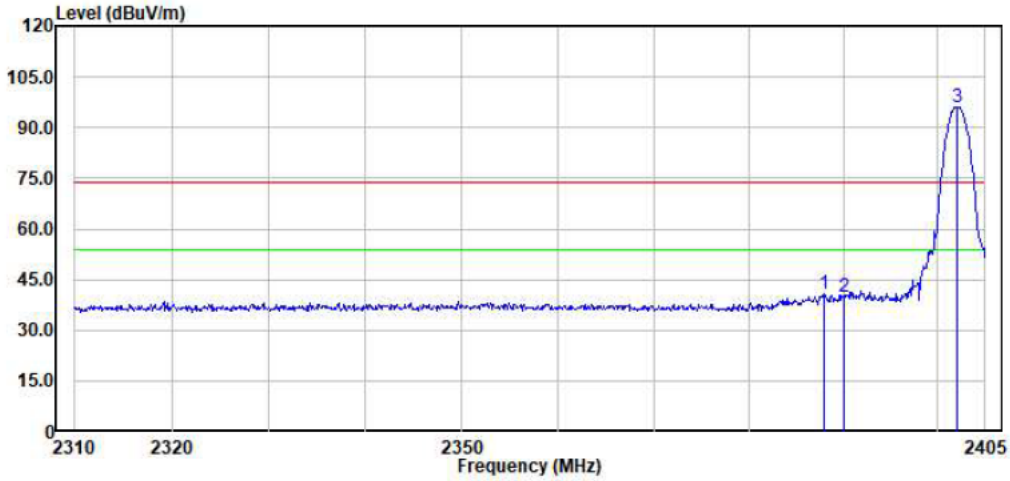
Test Mode: 04; Polarity: Horizontal; Modulation:8DPSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2387.900	5.69	26.72	49.75	57.92	40.58	74.00	-33.42	Peak
2	2390.000	5.69	26.73	49.74	57.13	39.81	74.00	-34.19	Peak
3	2402.055	5.71	26.75	49.73	113.46	96.19	74.00	22.19	Peak

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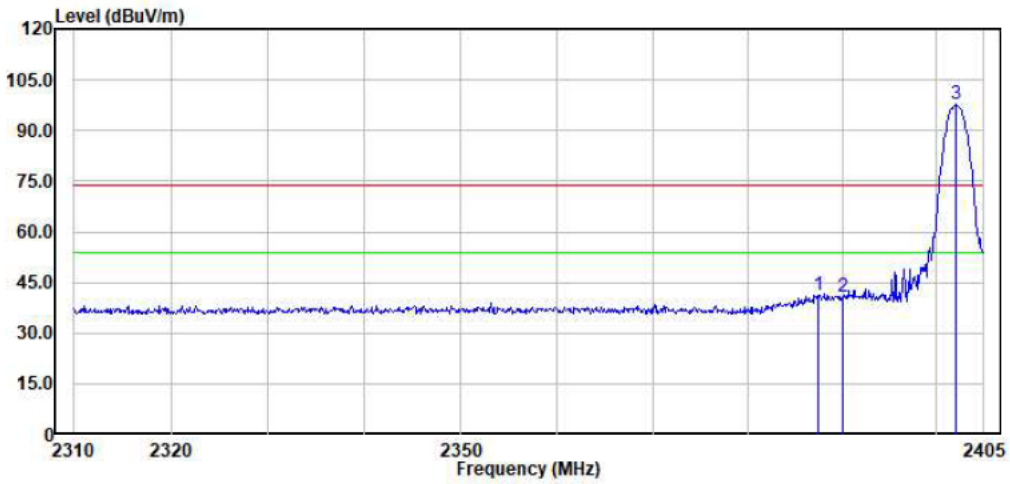
Test Mode: 04; Polarity: Vertical; Modulation:8DPSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2387.425	5.69	26.72	49.75	58.45	41.11	74.00	-32.89	Peak
2	2390.000	5.69	26.73	49.74	58.21	40.89	74.00	-33.11	Peak
3	2402.055	5.71	26.75	49.73	115.04	97.77	74.00	23.77	Peak

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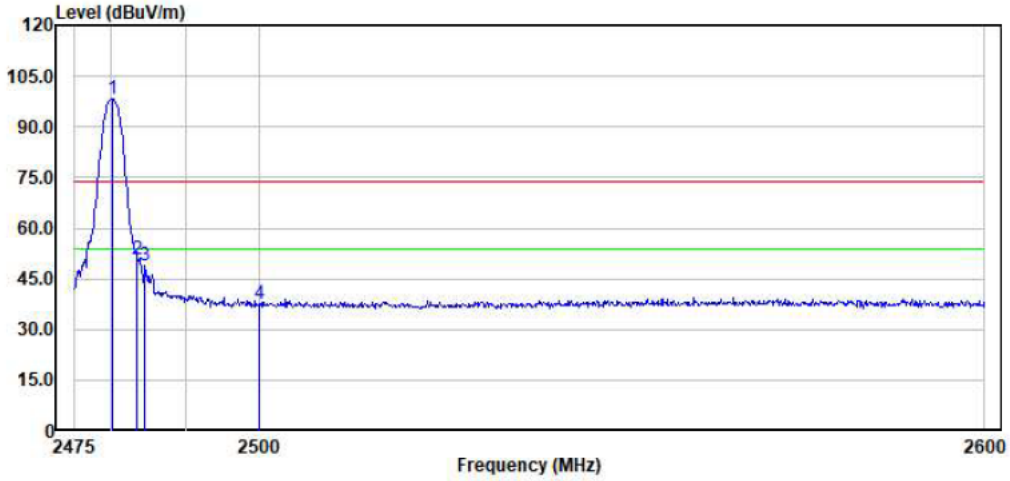
Test Mode: 04; Polarity: Horizontal; Modulation:8DPSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2480.125	5.82	27.03	49.66	115.20	98.39	74.00	24.39	Peak
2	2483.500	5.83	27.04	49.66	67.68	50.89	74.00	-23.11	Peak
3	2484.500	5.83	27.04	49.66	65.92	49.13	74.00	-24.87	Peak
4	2500.000	5.85	27.10	49.65	54.17	37.47	74.00	-36.53	Peak

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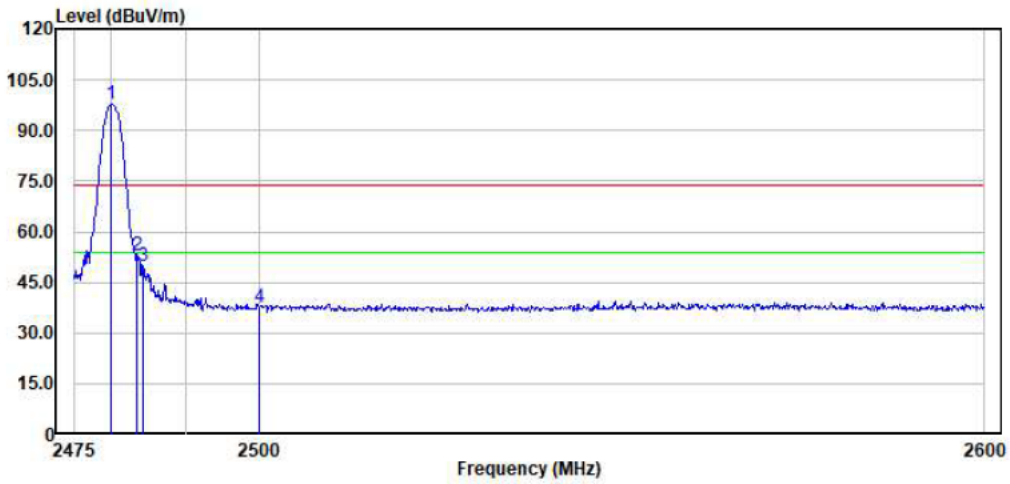
Test Mode: 04; Polarity: Vertical; Modulation:8DPSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	2480.000	5.82	27.03	49.66	114.49	97.68	74.00	23.68	Peak
2	2483.500	5.83	27.04	49.66	69.76	52.97	74.00	-21.03	Peak
3	2484.250	5.83	27.04	49.66	66.42	49.63	74.00	-24.37	Peak
4	2500.000	5.85	27.10	49.65	54.08	37.38	74.00	-36.62	Peak

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7.10 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
960-1000	500	3

7.10.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

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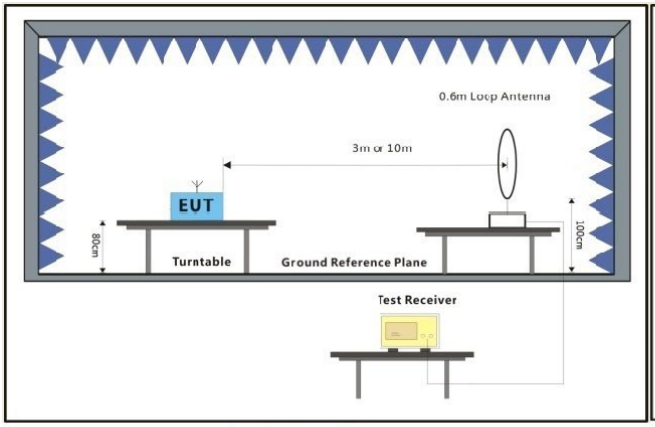
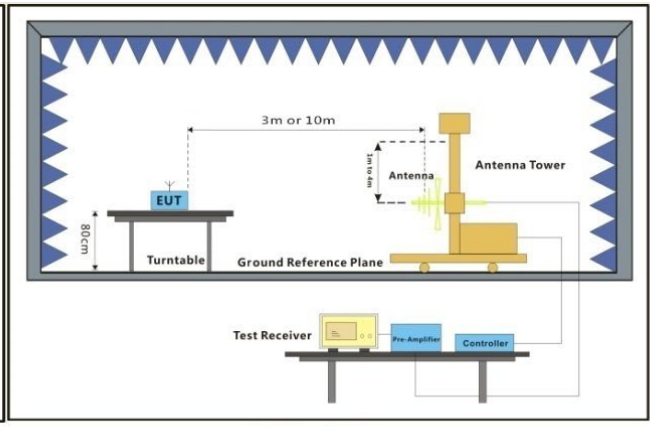
7.10.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

7.10.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics hd been displayed.

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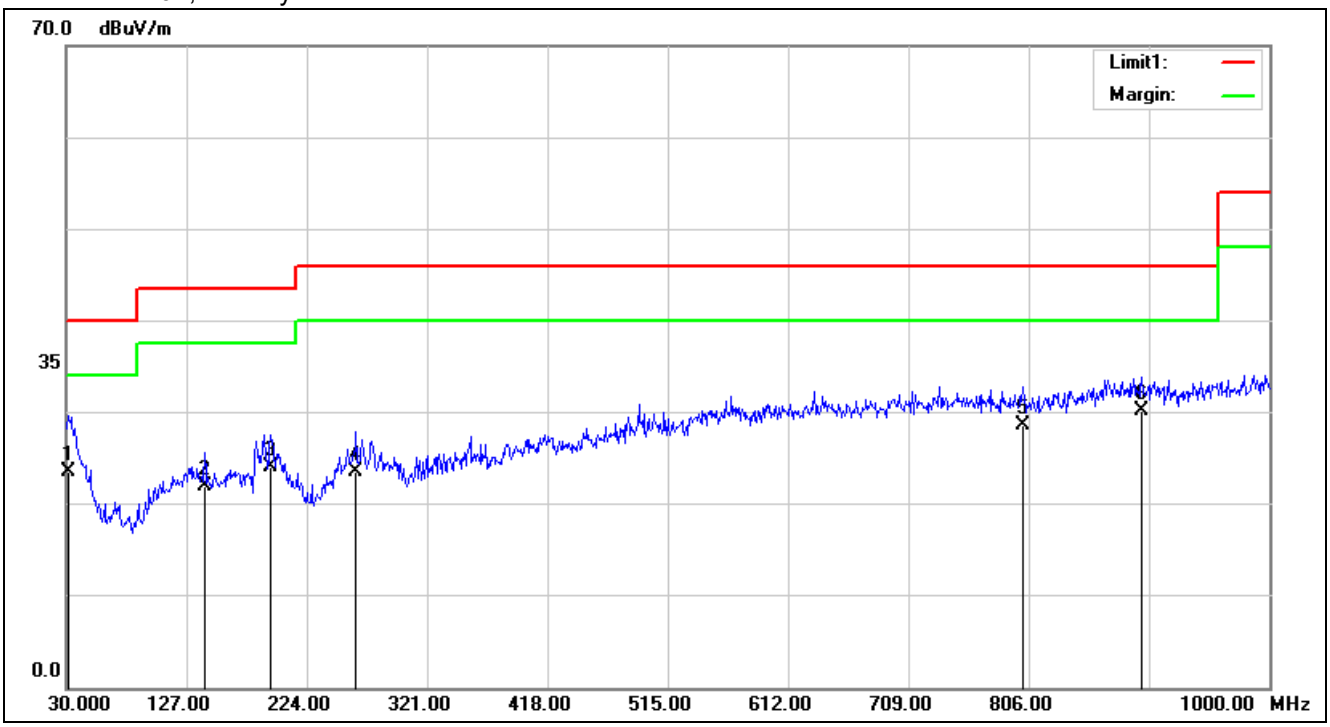
Test Mode: 04; Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	31.9400	-1.64	25.16	23.52	40.00	-16.48	100	148	QP
2	141.5500	3.64	18.38	22.02	43.50	-21.48	100	54	QP
3	194.9000	7.71	16.44	24.15	43.50	-19.35	100	325	QP
4	263.7700	2.60	21.02	23.62	46.00	-22.38	100	75	QP
5	801.1500	0.30	28.32	28.62	46.00	-17.38	100	267	QP
6	897.1800	0.55	29.62	30.17	46.00	-15.83	100	127	QP

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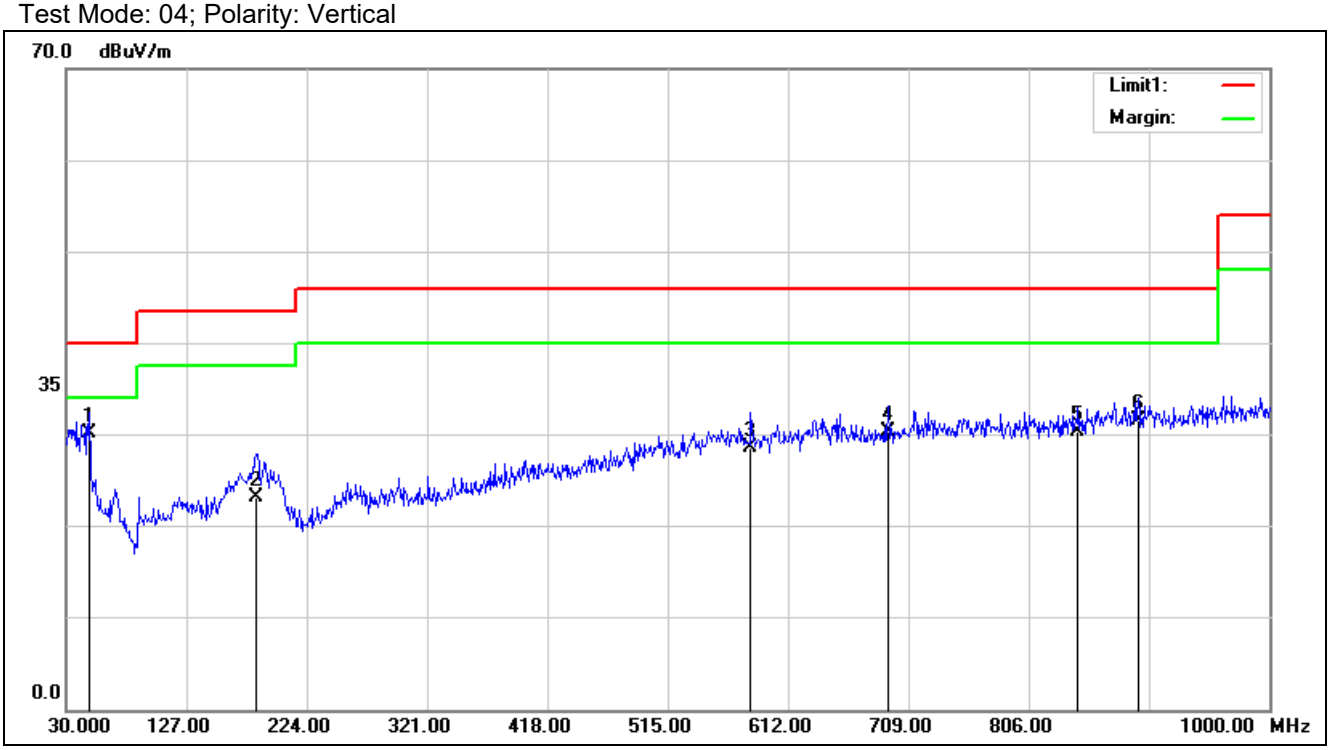
Test Mode: 04; Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	48.4300	11.85	18.40	30.25	40.00	-9.75	100	196	QP
2	183.2600	6.64	16.51	23.15	43.50	-20.35	100	219	QP
3	581.9300	1.61	27.01	28.62	46.00	-17.38	100	196	QP
4	692.5100	2.83	27.60	30.43	46.00	-15.57	100	222	QP
5	845.7700	1.70	28.75	30.45	46.00	-15.55	100	161	QP
6	894.2700	2.03	29.55	31.58	46.00	-14.42	100	358	QP

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7.11 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

7.11.1 E.U.T. Operation

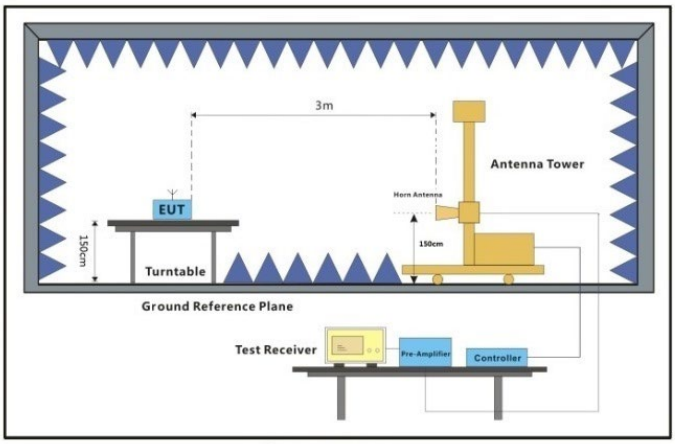
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.11.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.11.3 Test Setup Diagram



Above 1GHz

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7.11.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

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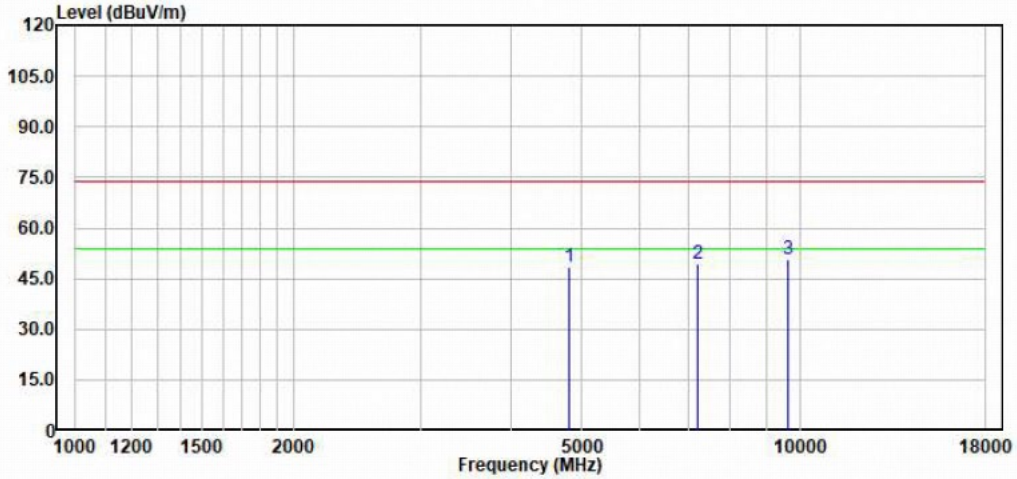
Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	53.73	48.28	74.00	-25.72	Peak
2	7206.000	10.34	35.44	46.94	50.63	49.47	74.00	-24.53	Peak
3	9608.000	12.29	36.92	45.89	47.26	50.58	74.00	-23.42	Peak

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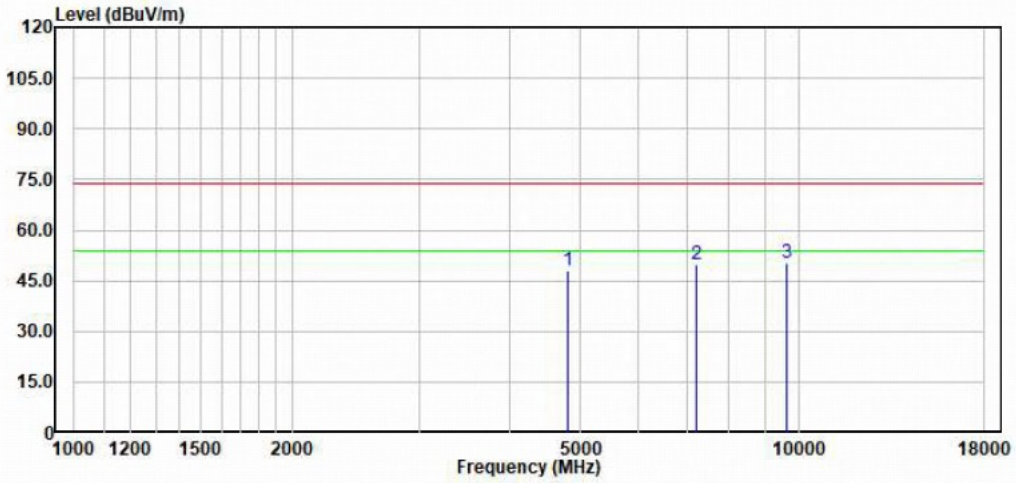
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	53.53	48.08	74.00	-25.92	Peak
2	7206.000	10.34	35.44	46.94	50.83	49.67	74.00	-24.33	Peak
3	9608.000	12.29	36.92	45.89	46.97	50.29	74.00	-23.71	Peak

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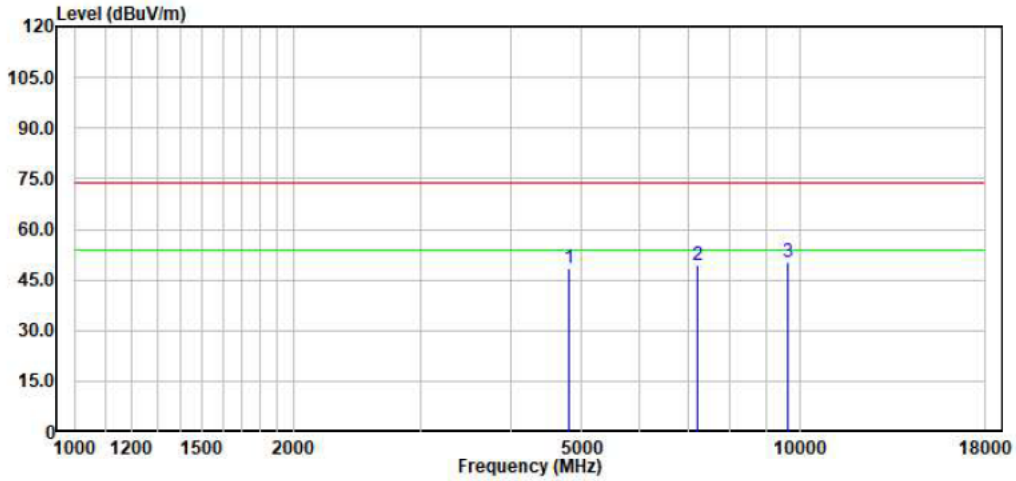
Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; Channel:middle



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	53.93	48.48	74.00	-25.52	Peak
2	7206.000	10.34	35.44	46.94	50.56	49.40	74.00	-24.60	Peak
3	9608.000	12.29	36.92	45.89	46.96	50.28	74.00	-23.72	Peak

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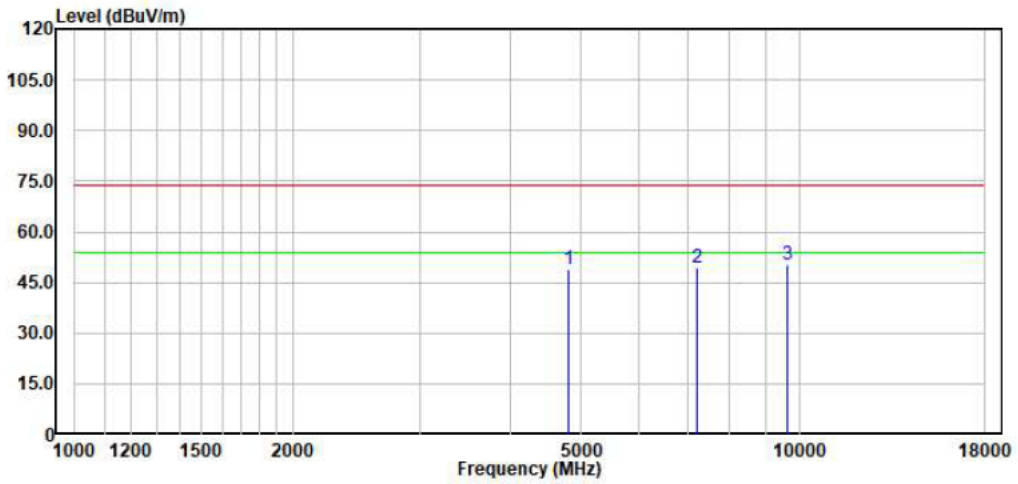
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; Channel:middle



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	54.41	48.96	74.00	-25.04	Peak
2	7206.000	10.34	35.44	46.94	50.46	49.30	74.00	-24.70	Peak
3	9608.000	12.29	36.92	45.89	46.84	50.16	74.00	-23.84	Peak

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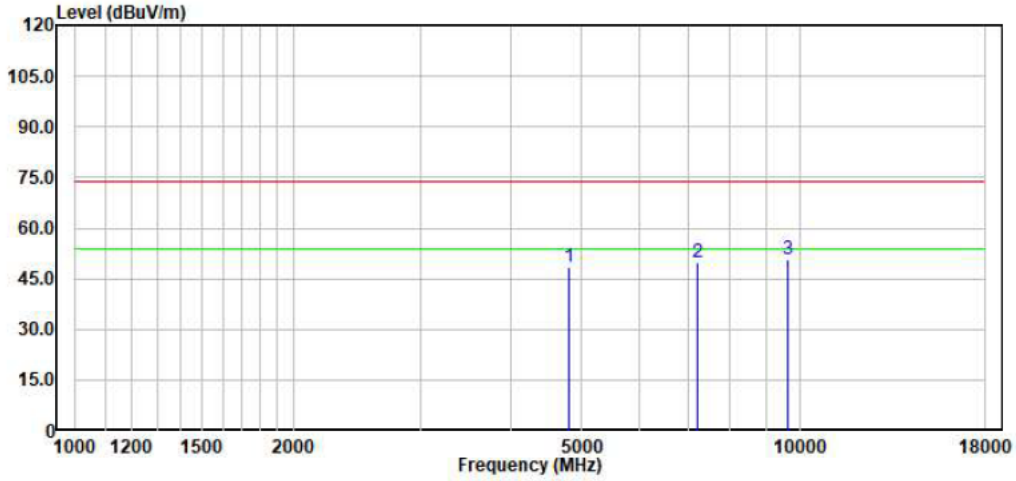
Test Mode: 04; Polarity: Horizontal; Modulation:GFSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	54.09	48.64	74.00	-25.36	Peak
2	7206.000	10.34	35.44	46.94	50.99	49.83	74.00	-24.17	Peak
3	9608.000	12.29	36.92	45.89	47.24	50.56	74.00	-23.44	Peak

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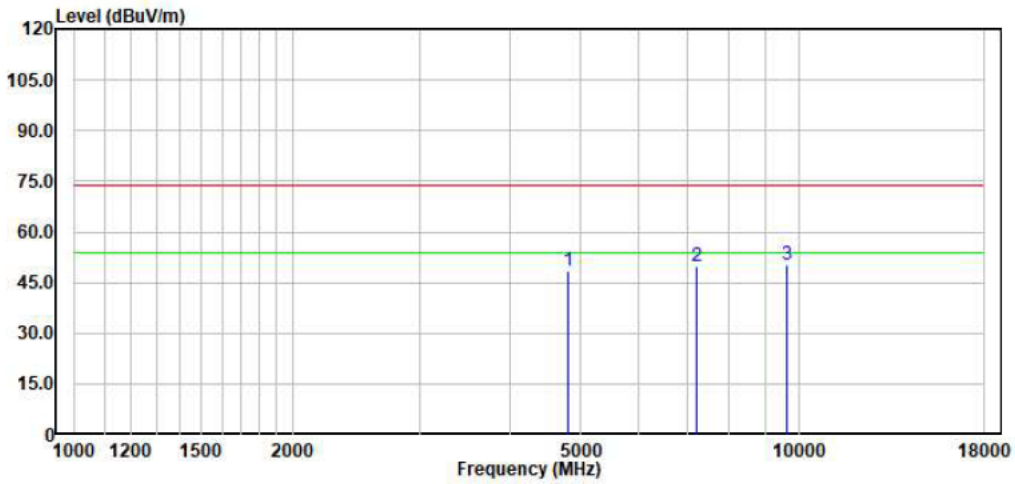
Test Mode: 04; Polarity: Vertical; Modulation:GFSK; Channel:High



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	53.79	48.34	74.00	-25.66	Peak
2	7206.000	10.34	35.44	46.94	51.10	49.94	74.00	-24.06	Peak
3	9608.000	12.29	36.92	45.89	46.89	50.21	74.00	-23.79	Peak

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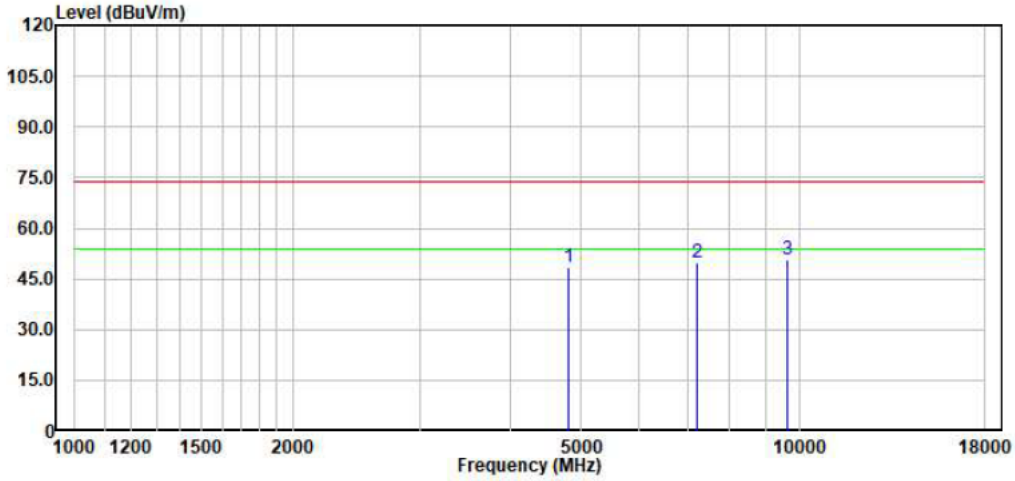
Test Mode: 04; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	53.95	48.50	74.00	-25.50	Peak
2	7206.000	10.34	35.44	46.94	50.92	49.76	74.00	-24.24	Peak
3	9608.000	12.29	36.92	45.89	47.54	50.86	74.00	-23.14	Peak

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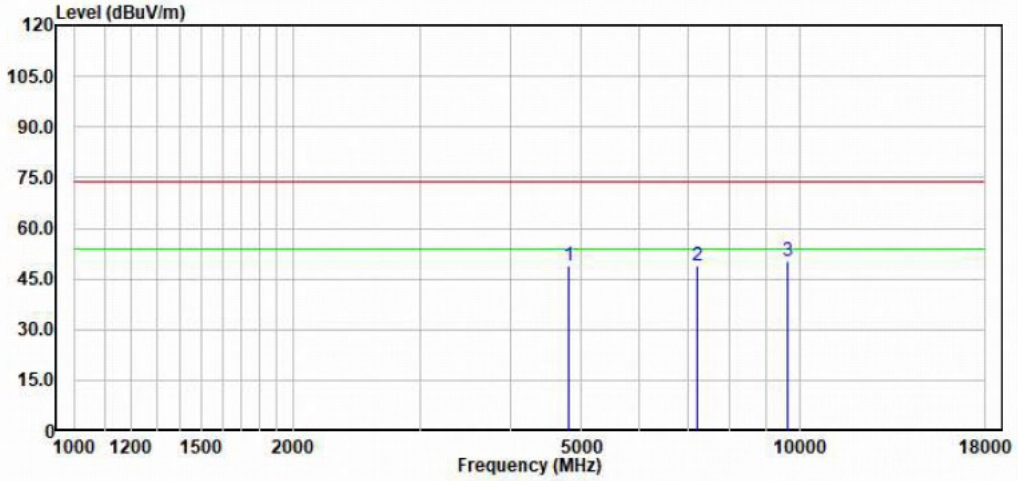
Test Mode: 04; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:Low



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	54.32	48.87	74.00	-25.13	Peak
2	7206.000	10.34	35.44	46.94	50.17	49.01	74.00	-24.99	Peak
3	9608.000	12.29	36.92	45.89	46.76	50.08	74.00	-23.92	Peak

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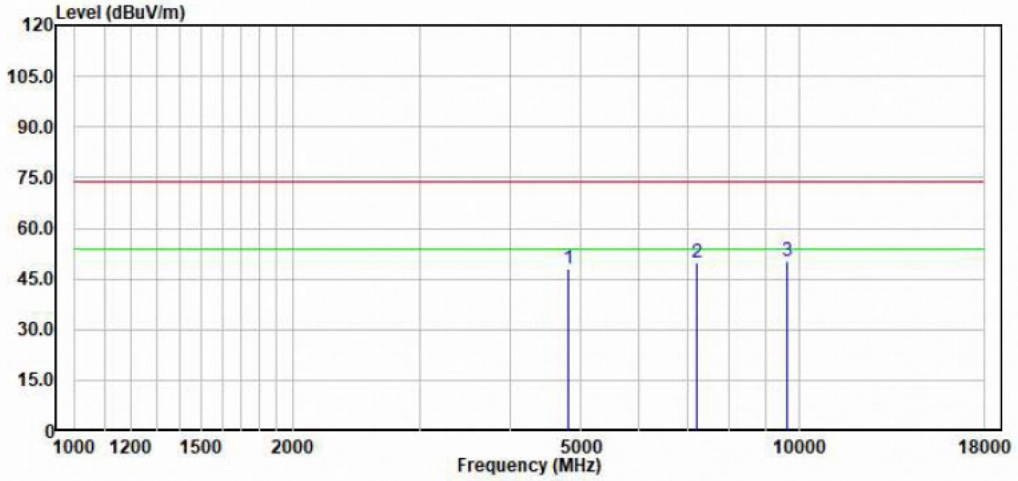
Test Mode: 04; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:middle



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	53.56	48.11	74.00	-25.89	Peak
2	7206.000	10.34	35.44	46.94	50.82	49.66	74.00	-24.34	Peak
3	9608.000	12.29	36.92	45.89	47.02	50.34	74.00	-23.66	Peak

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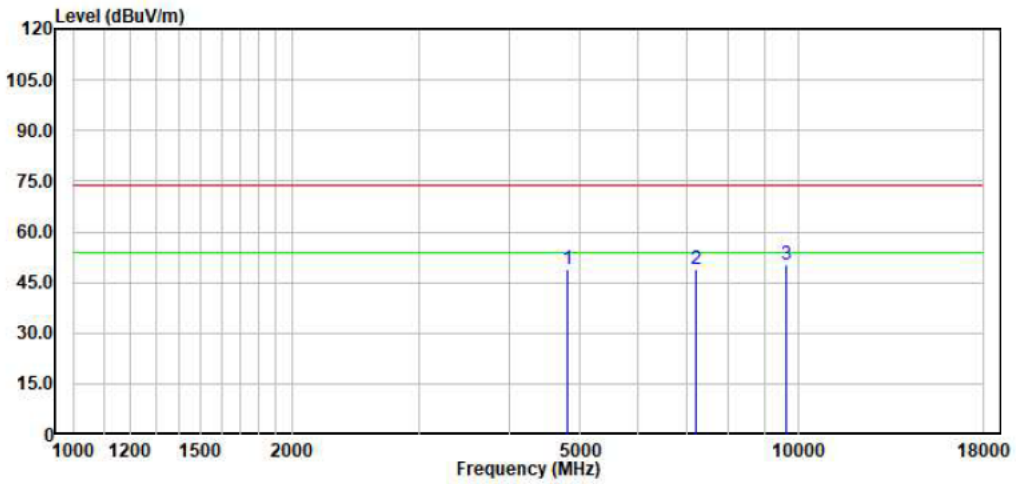

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	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	54.43	48.98	74.00	-25.02	Peak
2	7206.000	10.34	35.44	46.94	49.97	48.81	74.00	-25.19	Peak
3	9608.000	12.29	36.92	45.89	47.05	50.37	74.00	-23.63	Peak

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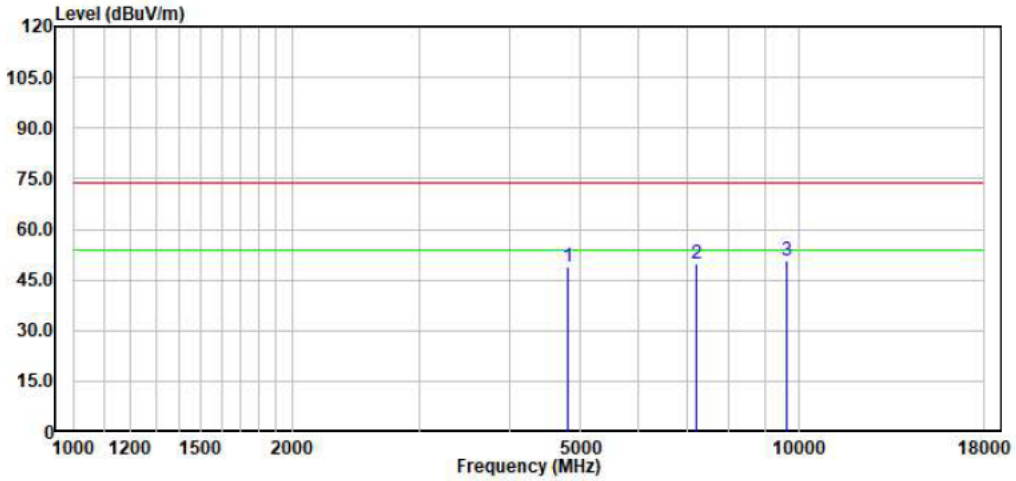

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2	7206.000	10.34	35.44	46.94	50.94	49.78	74.00	-24.22	Peak
3	9608.000	12.29	36.92	45.89	47.20	50.52	74.00	-23.48	Peak

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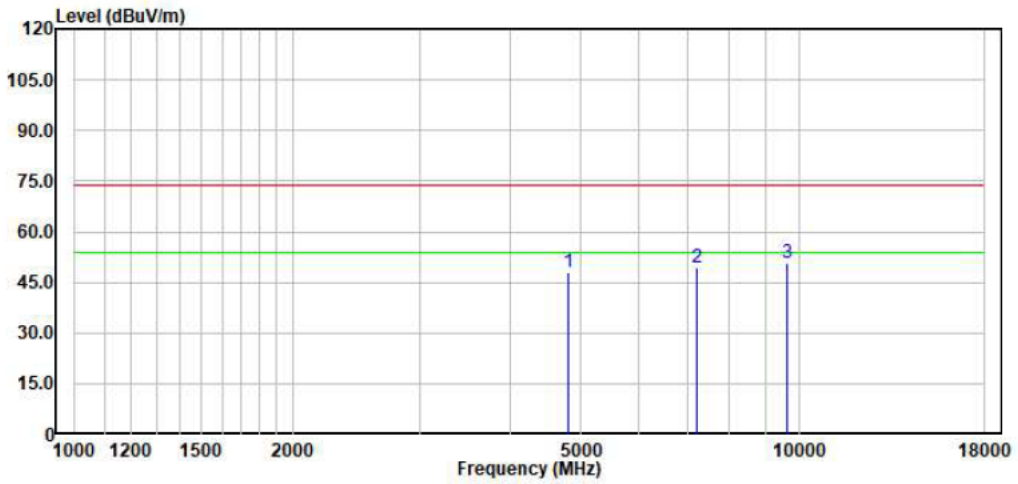
Test Mode: 04; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:High



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2	7206.000	10.34	35.44	46.94	50.36	49.20	74.00	-24.80	Peak
3	9608.000	12.29	36.92	45.89	47.58	50.90	74.00	-23.10	Peak

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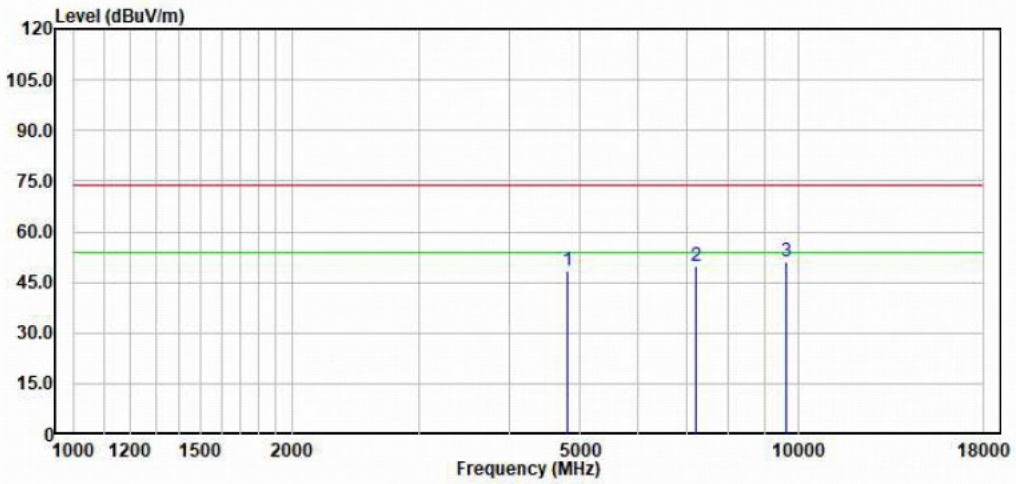
Test Mode: 04; Polarity: Horizontal; Modulation:8DPSK; Channel:Low



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2	7206.000	10.34	35.44	46.94	50.90	49.74	74.00	-24.26	Peak
3	9608.000	12.29	36.92	45.89	47.68	51.00	74.00	-23.00	Peak

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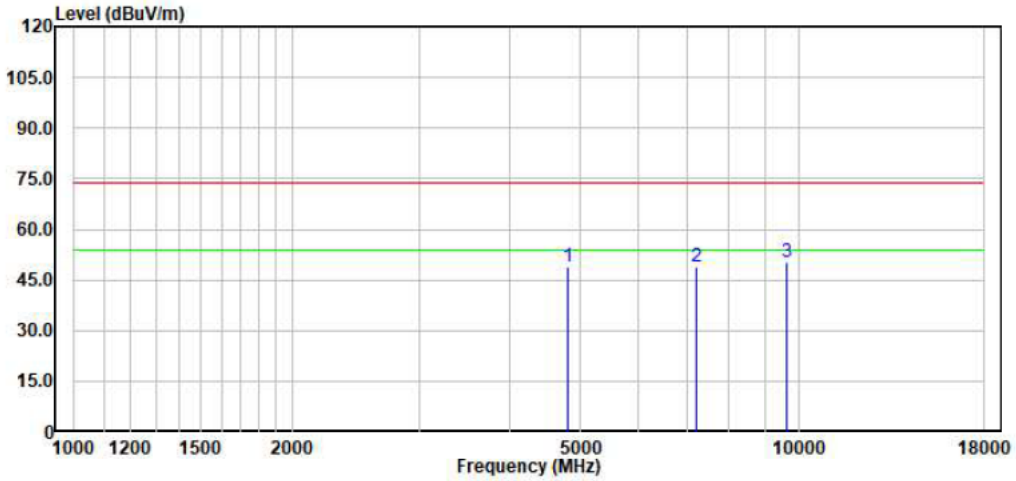
Test Mode: 04; Polarity: Vertical; Modulation:8DPSK; Channel:Low



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1	4804.000	8.12	34.18	47.75	54.26	48.81	74.00	-25.19	Peak
2	7206.000	10.34	35.44	46.94	50.27	49.11	74.00	-24.89	Peak
3	9608.000	12.29	36.92	45.89	47.04	50.36	74.00	-23.64	Peak

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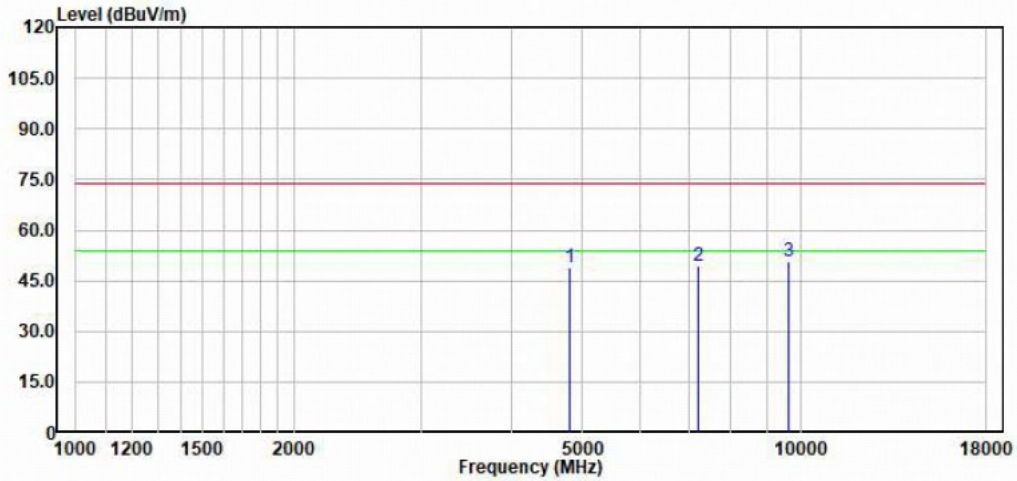
Test Mode: 04; Polarity: Horizontal; Modulation:8DPSK; Channel:middle



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2	7206.000	10.34	35.44	46.94	50.72	49.56	74.00	-24.44	Peak
3	9608.000	12.29	36.92	45.89	47.54	50.86	74.00	-23.14	Peak

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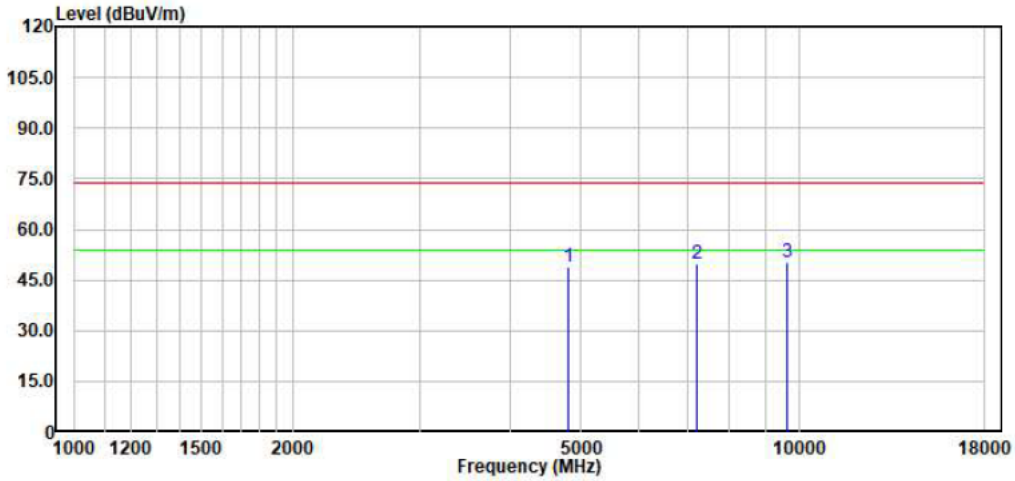
Test Mode: 04; Polarity: Vertical; Modulation:8DPSK; Channel:middle



	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	FCC CLA	Over FCC CLA	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	54.43	48.98	74.00	-25.02	Peak
2	7206.000	10.34	35.44	46.94	50.89	49.73	74.00	-24.27	Peak
3	9608.000	12.29	36.92	45.89	46.97	50.29	74.00	-23.71	Peak

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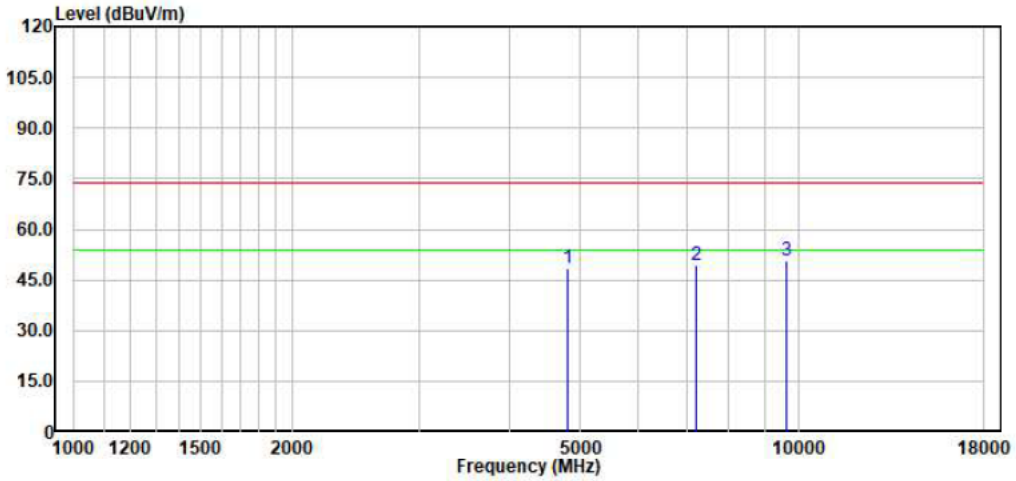
Test Mode: 04; Polarity: Horizontal; Modulation:8DPSK; Channel:High



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	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	53.79	48.34	74.00	-25.66	Peak
2	7206.000	10.34	35.44	46.94	50.56	49.40	74.00	-24.60	Peak
3	9608.000	12.29	36.92	45.89	47.38	50.70	74.00	-23.30	Peak

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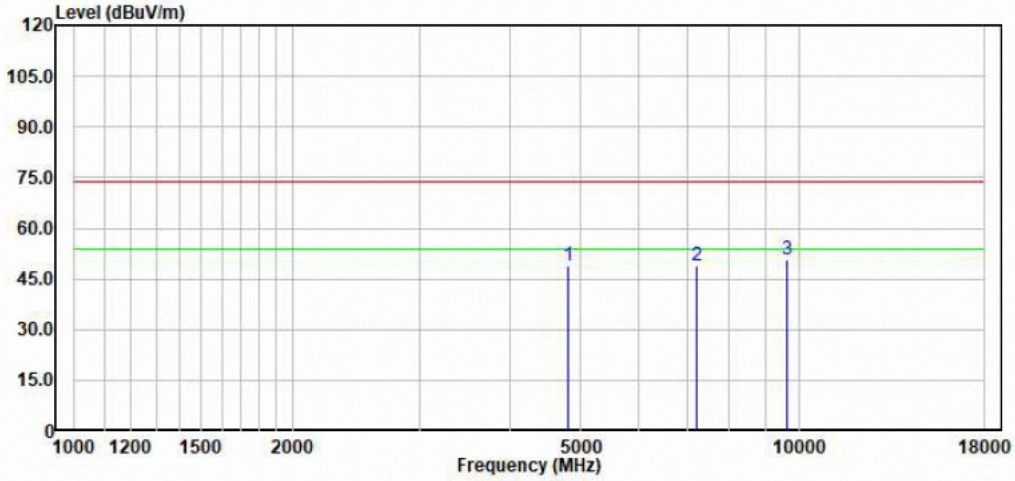

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	MHz	dB	dB/m	dB	dBuV	dBuV/m			
1	4804.000	8.12	34.18	47.75	54.20	48.75	74.00	-25.25	Peak
2	7206.000	10.34	35.44	46.94	50.18	49.02	74.00	-24.98	Peak
3	9608.000	12.29	36.92	45.89	47.47	50.79	74.00	-23.21	Peak

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7.12 99% Bandwidth

Test Requirement RSS-Gen Section 6.7

Test Method: ANSI C63.10 Section 6.9.3

7.12.1 E.U.T. Operation

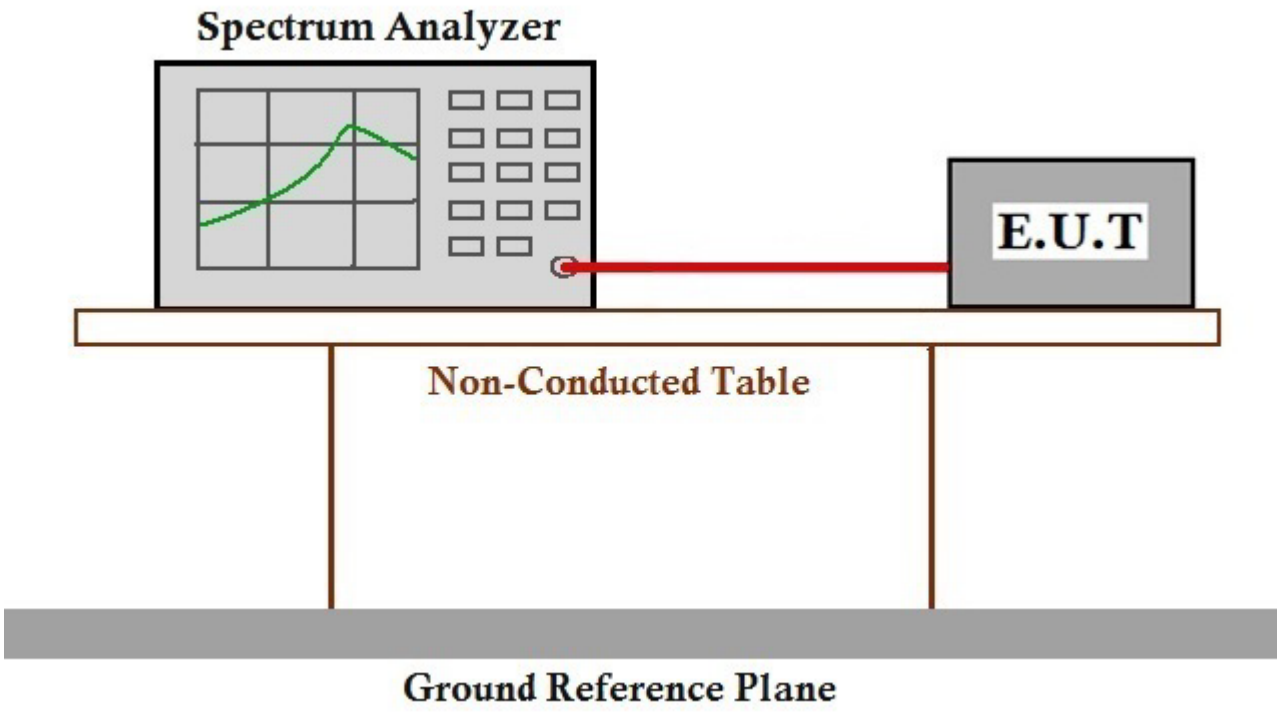
Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

7.12.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.12.3 Test Setup Diagram



7.12.4 Measurement Procedure and Data

The detailed test data see: Appendix B for KSCR220400050302

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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2204000503AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2204000503AT

- End of the Report -

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