

FCC Test Report

Report No.: AGC12060240301FR01

FCC ID : 2AY4C-GAX01

APPLICATION PURPOSE: Original Equipment

PRODUCT DESIGNATION: Mini PC

BRAND NAME : GEEKOM, geeknuc

AX8 Max, XT***Pro, XT***Max, A***, A***Pro, A***Max, AX***, AX***Pro, AX***Max, AE***, AE***Pro, AE***Max,

GT***, GT***Max, GT***Pro, XU***, XU***Pro, XU***Max,

MODEL NAME : AG^{***} Pro, AG^{***} Max, GT^{***} Ultra, GT^{***} Mega, U^{***} Ultra,

U*** Mega, XT***Ultra, XT***Mega, IT***Ultra,

IT***Mega(*= 0-9,A-Z,a-z, ""-" or blank)

APPLICANT: Shenzhen Jiteng Network Technology Co., Ltd

DATE OF ISSUE : Jul. 11, 2024

STANDARD(S) : FCC Part 15 Subpart C §15.247

REPORT VERSION :

Attestation of Global Compliance (Shenzhen) Co., Ltd



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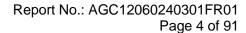
Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul. 11, 2024	Valid	Initial Release



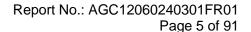
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1. General Information

Applicant	Shenzhen Jiteng Network Technology Co., Ltd
Address	Floor 7, Building B, Boton Science and Technology Park, Chaguang Road, Xili Street, Nanshan District, Shenzhen, China
Manufacturer	Shenzhen Jiteng Network Technology Co., Ltd
Address	Floor 7, Building B, Boton Science and Technology Park, Chaguang Road, Xili Street, Nanshan District, Shenzhen, China
Factory	China Greatwall Technology Group Co., Ltd.Shiyan Branch
Address	Great-Wall Computer Industry Park, Baoshi East Rd.Shiyan County, Baoan, Shenzhen, P.R.China
Product Designation	Mini PC
Brand Name	GEEKOM, geeknuc
Test Model	AX8 Max
Series Model	XT***Pro, XT***Max, A***, A***Pro, A***Max, AX***, AX***Pro, AX***Max, AE***, AE***Pro, AE***Max, GT***, GT***Max, GT***Pro, XU***, XU***Pro, XU***Max, AG***Pro, AG***Max, GT***Ultra, GT***Mega, U***Ultra, U*** Mega, XT***Ultra, XT***Mega, IT***Ultra, IT***Mega(*= 0-9,A-Z,a-z,""-"or blank)
Declaration of Difference	Please review the manufacturer's model difference statement
Date of receipt of test item	Mar. 14, 2024
Date of Test	Mar. 14, 2024~Jul. 11, 2024
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-BR_EDR-V1

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

Prepared By	Alan Duan	
	Alan Duan (Project Engineer)	Jul. 11, 2024
Reviewed By	Calin Lin	
	Calvin Liu (Reviewer)	Jul. 11, 2024
Approved By	Max Zhang	
	Max Zhang Authorized Officer	Jul. 11, 2024



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2. Product Information

2.1 Product Technical Description

Frequency Band	2400MHz-2483.5MHz
Operation Frequency Range	2402MHz-2480MHz
Bluetooth Version	V5.2
Modulation Type	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK
Number of channels	79 Channels
Channel Separation	1 MHz
Maximum Transmitter Power	1.759dBm
Hardware Version	NUCPN01_MB_V20
Software Version	Windows 11
Antenna Designation	Iron Antenna
Antenna Gain	3.09dBi
Power Supply	DC 19V for by adapter

2.2 Test Frequency List

Frequency Band	Channel Number	Frequency
	0	2402 MHz
	1	2403 MHz
	:	:
2400~2483.5MHz	39	2441MHz
	:	:
	77	2479 MHz
	78	2480 MHz



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2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID:2AY4C-GAX01, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.4 Test Methodology

The tests were performed according to following standards:

No.	Identity	Document Title			
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations			
2	FCC 47 CFR Part 15	Radio Frequency Devices			
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices			
4	KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for compliance measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum system, and Hybrid system devices operating under Section 15.247 of the FCC rules			

2.5 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 multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

2.6 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 behavior action with other units only offset is 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 bits 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 the Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer (and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always differ from the first one.

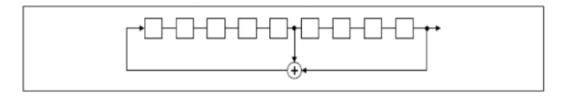


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2.7 Pseudorandom Frequency Hopping Sequence

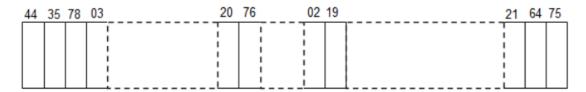
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized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

The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.



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2.8 Special Accessories

Not available for this EUT intended for grant.

2.9 Equipment Modifications

Not available for this EUT intended for grant.

2.10 Antenna Requirement

Standard Requirement

15.203 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 non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 3.09dBi.



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3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

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

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.



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3.3 Environmental Conditions

	Normal Conditions		
Temperature range (℃)	15 - 35		
Relative humidity range	20 % - 75 %		
Pressure range (kPa)	86 - 106		
Power supply	DC 19V		

3.4 Measurement Uncertainty

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%

	differentiality multiplied by a coverage factor of k=z, provi	ding a level of confidence of approximately 95 %.		
	Item	Measurement Uncertainty		
Uncertainty of Conducted Emission for AC Port		$U_c = \pm 2.9 \text{ dB}$		
	Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 3.9 \text{ dB}$		
Uncertainty of Radiated Emission above 1GHz		$U_c = \pm 4.9 \text{ dB}$		
Uncertainty of total RF power, conducted		$U_c = \pm 0.8 \text{ dB}$		
Uncertainty of RF power density, conducted		$U_c = \pm 2.6 \text{ dB}$		
Uncertainty of spurious emissions, conducted		U _c = ±2 %		
Uncertainty of Occupied Channel Bandwidth		U _c = ±2 %		



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3.5 List of Equipment Used

• R	RF Conducted Test System							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)	
\boxtimes	AGC-ER-E036	Spectrum Analyzer	Agilent	N9020A	MY49100060	2023-06-01	2024-05-31	
\boxtimes	AGC-ER-E036	Spectrum Analyzer	Agilent	N9020A	MY49100060	2024-05-24	2025-05-23	
\boxtimes	AGC-ER-E061	Spectrum Analyzer	Agilent	N9020A	MY52090123	2023-06-03	2024-06-02	
\boxtimes	AGC-ER-E061	Spectrum Analyzer	Agilent	N9020A	MY52090123	2024-05-28	2025-05-27	
	AGC-ER-E062	Power Sensor	Agilent	U2021XA	MY54110007	2024-02-01	2025-01-31	
	AGC-ER-E063	Power Sensor	Agilent	U2021XA	MY54110009	2024-02-01	2025-01-31	
\boxtimes	AGC-EM-A152	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08	
	AGC-ER-E083	Signal Generator	Agilent	E4421B	US39340815	2023-06-01	2024-05-31	
	AGC-ER-E083	Signal Generator	Agilent	E4421B	US39340815	2024-05-23	2025-05-22	
\boxtimes	N/A	RF Connection Cable	N/A	1#	N/A	Each time	N/A	
	N/A	RF Connection Cable	N/A	2#	N/A	Each time	N/A	

• F	Radiated Spurious Emission						
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2024-02-01	2025-01-31
\boxtimes	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2023-06-03	2024-06-02
\boxtimes	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2024-05-24	2025-05-23
\boxtimes	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2023-06-01	2024-05-31
\boxtimes	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2024-05-28	2025-05-27
\boxtimes	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2024-03-05	2026-03-04
\boxtimes	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
\boxtimes	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2023-04-02	2024-04-01
	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2024-03-31	2025-03-30
\boxtimes	AGC-EM-E082	Horn Antenna	SCHWARZBECK	BBHA 9170	#768	2023-09-24	2025-09-23
\boxtimes	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2022-08-04	2024-08-03
	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2023-06-01	2024-05-31
\boxtimes	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2024-05-23	2025-05-22
\boxtimes	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08
	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08



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A	AC Power Line Conducted Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)	
\boxtimes	AGC-EM-E045	EMI Test Receiver	R&S	ESPI	101206	2023-06-03	2024-06-02	
	AGC-EM-E045	EMI Test Receiver	R&S	ESPI	101206	2024-05-28	2025-05-27	
	AGC-EM-A130	6dB Attenuator	Eeatsheep	LM-XX-6-5W	DC-6GZ	2023-06-09	2025-06-08	
	AGC-EM-E023	AMN	R&S	100086	ESH2-Z5	2023-06-03	2024-06-02	
\boxtimes	AGC-EM-E023	AMN	R&S	100086	ESH2-Z5	2024-05-28	2025-05-27	

Test Software							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information		
\boxtimes	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71		
\boxtimes	AGC-EM-S003	RE Test System	FARA	EZ-EMC	VRA-03A		
\boxtimes	AGC-ER-S012	BT/WIFI Test System	Tonscend	JS1120-2	2.6		
\boxtimes	AGC-EM-S011	RSE Test System	Tonscend	TS+-Ver2.1(JS36-RSE)	4.0.0.0		



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4. System Test Configuration

4.1 EUT Configuration

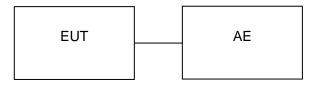
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

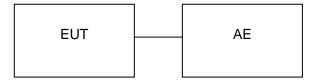
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System

Radiated Emission Configure:



Conducted Emission Configure:



4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

☐ Test Accessories Come From The Laboratory

No.	Equipment	Manufacturer	Model No.	Specification Information	Cable
1	Earphone	CXT	N/A	N/A	1.2m unshielded
2	Keyboard	Dell	SK-8120	N/A	1.8m,unshielded
3	Mouse	Dell	EMS-537A	N/A	1.7m,unshielded
4	U Disc	Kingston	DT100G3	32G	N/A



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No.	Equipment	uipment Manufacturer Model N		Specification Information	Cable
1	Adapter 1#	Shenzhen Hyleton Technology Co., Ltd.	Hyleton-120W-1906320	Input: AC 100-240V 50/60Hz, 2A Output: DC 19V 6.32A	3.5m
2	Adapter 2#	SHENZHEN BSY TECHNOLOGY CO.,LTD.	BSY120S1906323D	Input: AC 100-240V 50/60Hz, 2.5A Output: DC 19V 6.32A	3.5m
3	Adapter 3#	FSP Group Inc.	FSP120-ABBU3	Input: AC 100-240V 50/60Hz, 1.4A Output: DC 19V 6.32A	3.5m



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4.5 Summary of Test Results

Item	FCC Rules	Description of Test	Result
1	§15.203&15.247(b)(4)	Antenna Equipment	Pass
2	§15.247 (b)(1)	RF Output Power	Pass
3	§15.247 (a)(1)	20 dB Bandwidth	Pass
4	§15.247 (d)	Conducted Band Edge and Out-of-Band Emissions	Pass
5	§15.209	Radiated Spurious Emission	Pass
6	§15.247 (a)(1)(iii)	Number of Hopping Frequency	Pass
7	§15.247 (a)(1)(iii)	Time of Occupancy	Pass
8	§15.247 (a)(1)	Frequency Separation	
9	§15.207	§15.207 AC Power Line Conducted Emission	



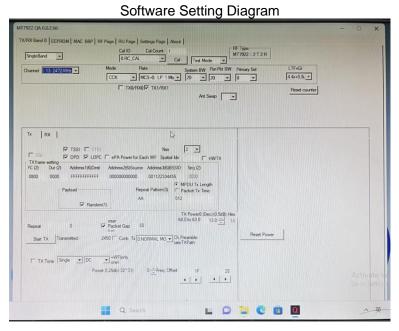


5. Description of Test Modes

Summary table of Test Cases					
Test Item	Data Rate / Modulation				
rest item	Bluetooth – BR_EDR (GFSK/π /4-DQPSK/8DPSK)				
Radiated & Conducted Test Cases	Mode 1: Bluetooth Tx CH00_2402 MHz_1Mbps (AC/DC adapter) Mode 2: Bluetooth Tx CH39_2441 MHz_1Mbps (AC/DC adapter) Mode 3: Bluetooth Tx CH78_2480 MHz_1Mbps (AC/DC adapter) Mode 4: Bluetooth Tx CH00_2402 MHz_2Mbps (AC/DC adapter) Mode 5: Bluetooth Tx CH39_2441 MHz_2Mbps (AC/DC adapter) Mode 6: Bluetooth Tx CH78_2480 MHz_2Mbps (AC/DC adapter) Mode 7: Bluetooth Tx CH00_2402 MHz_3Mbps (AC/DC adapter) Mode 8: Bluetooth Tx CH39_2441 MHz_3Mbps (AC/DC adapter) Mode 9: Bluetooth Tx CH78_2480 MHz_3Mbps (AC/DC adapter) Mode10: Bluetooth Tx Hopping-1Mbps (AC/DC adapter) Mode11: Bluetooth Tx Hopping-2Mbps (AC/DC adapter) Mode12: Bluetooth Tx Hopping-3Mbps (AC/DC adapter)				
AC Conducted Emission	Mode 1: Bluetooth Link from AC/DC Adapter 1# Mode 2: Bluetooth Link from AC/DC Adapter 2# Mode 3: Bluetooth Link from AC/DC Adapter 3#				

Note:

- 1. Only the result of the worst case was recorded in the report, if no other cases.
- 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
- 3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
- 4. Radiation test evaluation: The main test model and series models are pre-tested with 3 adapters, and the appearance of the main test model (model: AX8 Max) and the 3 adapters is recorded as the worst result; the difference in the shell of the power supply end interference part is ignored and only the appearance of the main test model (model: AX8 Max) and the 3 adapters is recorded as the worst result.
- Regarding Radiated Band Edge, as the worst result, only the main test appearance (model: AX8 Max) is r eflected with adapter 1#.



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.



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6. RF Output Power Measurement

6.1 Provisions Applicable

The maximum out power permissible output power is 1 Watt for all frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

The maximum out power permissible output power is 0.125 watts for all other frequency hopping systems in the 2400-2483.5 MHz band.

6.2 Measurement Procedure

⊠For Peak power test:

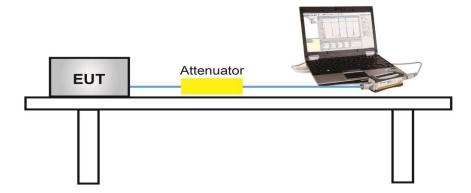
- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 3. RBW > 20 dB bandwidth of the emission being measured.
- 4. VBW ≥RBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.
- 8. Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

I	For	Averag	e no	wer	test:
П		NVCIAG	\circ	VV (C)	iooi.

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required

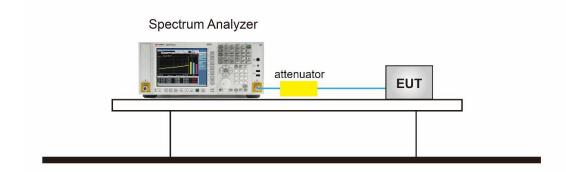
6.3 Measurement Setup (Block Diagram of Configuration)

For Average power test setup





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6.4 Measurement Result

Test Data of Conducted Output Power						
Test Mode	Test Frequency (MHz)	Peak Power (dBm)	Limits (dBm)	Pass or Fail		
	2402	1.288	≤21	Pass		
GFSK	2441	1.759	≤21	Pass		
	2480	0.708	≤21	Pass		
	2402	-0.770	≤21	Pass		
π /4-DQPSK	2441	-0.218	€21	Pass		
	2480	-0.814	≤21	Pass		
	2402	-0.557	≤21	Pass		
8DPSK	2441	-0.008	≤21	Pass		
	2480	-0.646	≤21	Pass		



0 Hz

Scale Type

Log

Span 5.000 MHz Sweep 1.066 ms (1000 pts)





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Test_Graph_BR_Chain A_2441_1Mbps_Peak Power

#VBW 5.0 MHz

Center 2.441000 GHz #Res BW 1.5 MHz

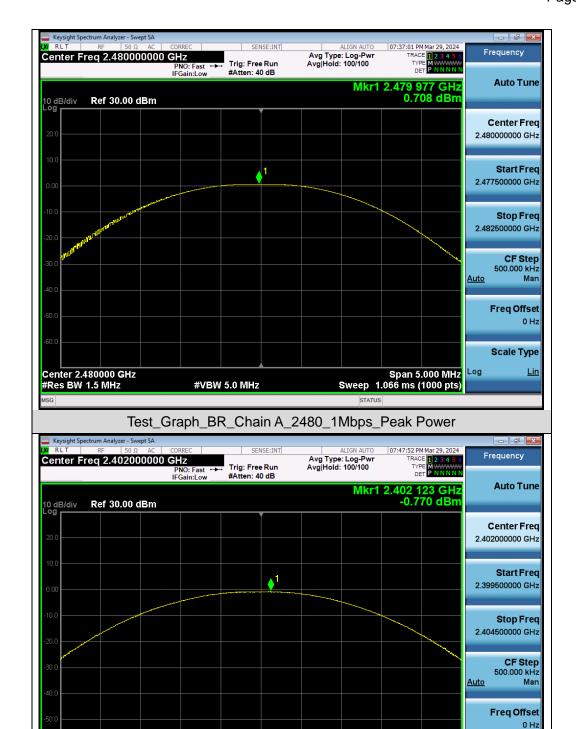


Scale Type

Log

Span 5.000 MHz Sweep 1.066 ms (1000 pts)



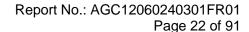


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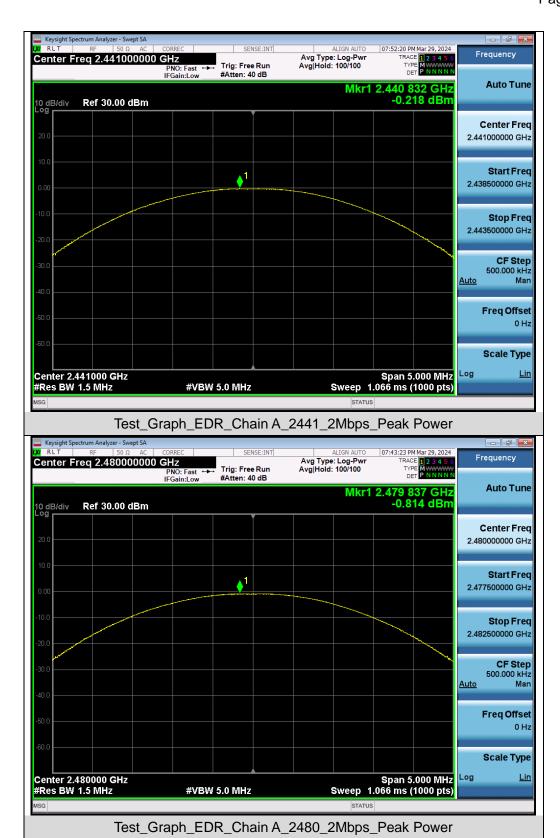
Test Graph EDR Chain A 2402 2Mbps Peak Power

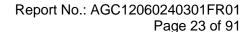
#VBW 5.0 MHz

Center 2.402000 GHz #Res BW 1.5 MHz

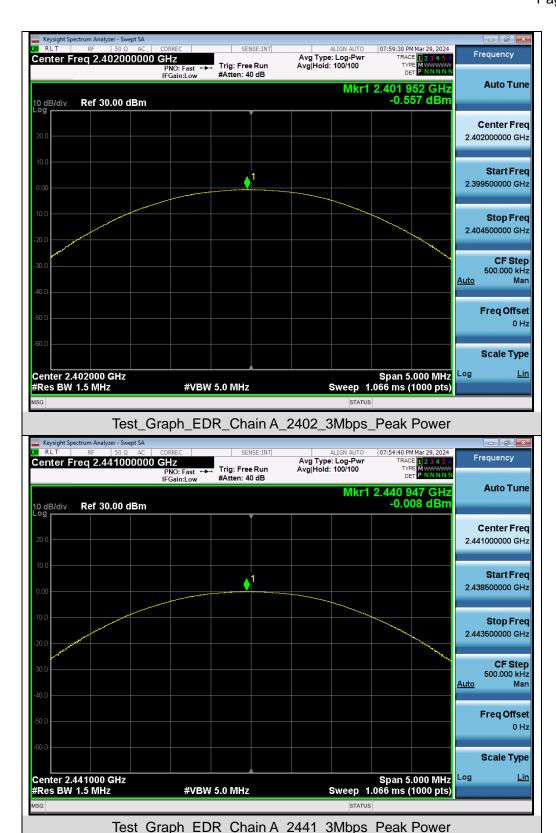


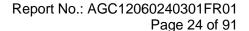


















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7. 20dB Bandwidth and 99% Occupied Bandwidth Measurement

7.1 Provisions Applicable

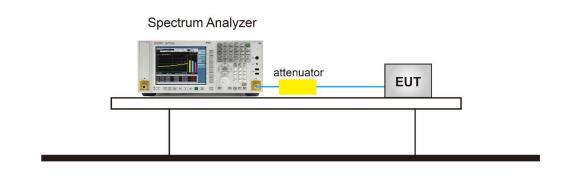
There is no corresponding limit requirement for this test item.

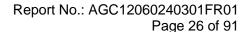
7.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 6.9.3 (OBW) and 6.9.2 (20dB BW).

- The 20dB bandwidth spectrum analyzer setting reference is as follows:
- 1. Set RBW ≥ 1% to 5% of the 20dB bandwidth
- 2. VBW = Approximately three times RBW
- 3. Span = Approximately 2 to 5 times the 20dB bandwidth, centered on a hopping channel
- 4. Detector = Peak
- 5. Trace mode = Max hold
- Sweep = Auto couple
- 7. Allow the trace to stabilize
- 8. Measure the maximum width of the emission that is constrained by the frequencies associated
- 9. with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20
- 10. dB relative to the maximum level in the fundamental emission.
- The 99% bandwidth spectrum analyzer setting reference is as follows:
- 1. Span = 1.5 times to 5 times the OBW
- 2. Set RBW = 1% to 5% the OBW
- 3. VBW ≥ 3 × RBW
- 4. Detector = Peak
- 5. Trace mode = Max hold
- 6. Sweep = Auto couple
- 7. Allow the trace was allowed to stabilize

7.3 Measurement Setup (Block Diagram of Configuration)



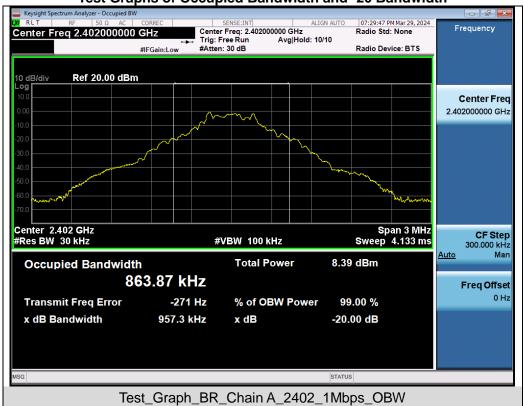


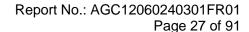


7.4 Measurement Results

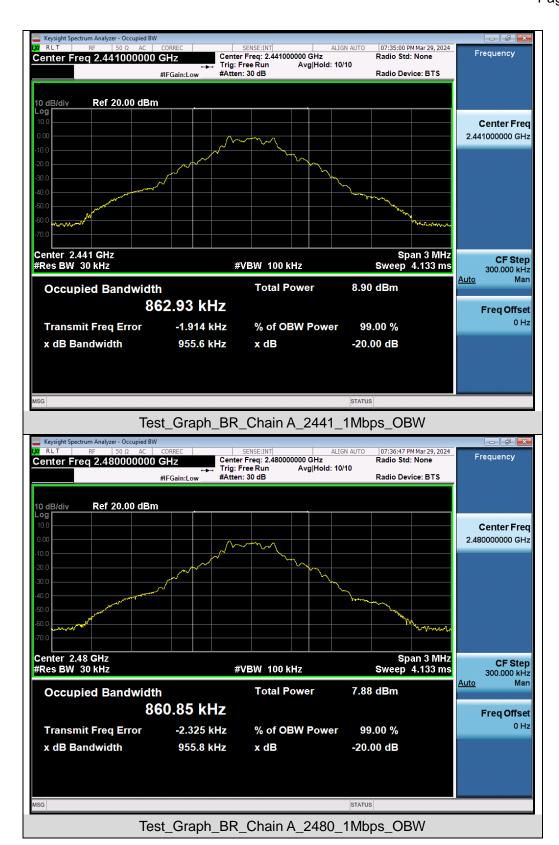
Test Data of Occupied Bandwidth and -20dB Bandwidth							
Test Mode	Test Frequency (MHz)	99% Occupied Bandwidth (MHz)	-20dB Bandwidth (MHz)	Limits	Pass or Fail		
	2402	0.864	0.957	N/A	Pass		
GFSK	2441	0.863	0.956	N/A			
	2480	0.861	0.956	N/A	Pass		
	2402	1.178	1.283	N/A	Pass		
π /4-DQPSK	2441	1.177	1.283	N/A	Pass		
	2480	1.177	1.283	N/A	Pass		
	2402	1.178	1.298	N/A	Pass		
8DPSK	2441	1.179	1.298	N/A	Pass		
	2480	1.180	1.298	N/A	Pass		

Test Graphs of Occupied Bandwidth and -20 Bandwidth



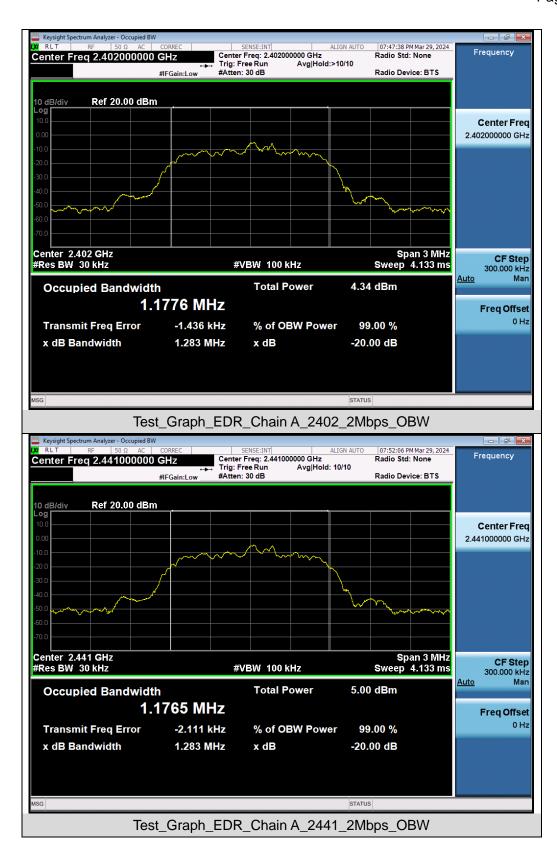


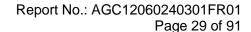






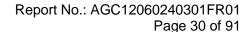




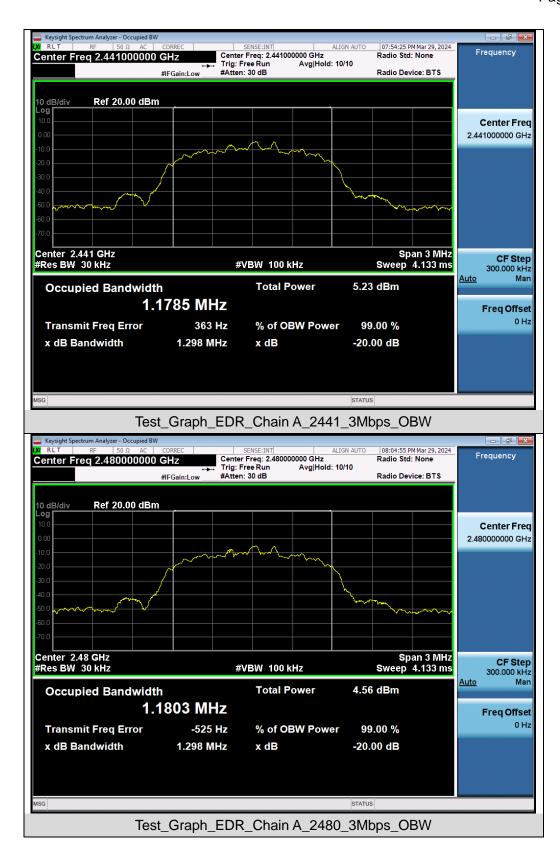












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8. Conducted Band Edge and Out-of-Band Emissions

8.1 Provisions Applicable

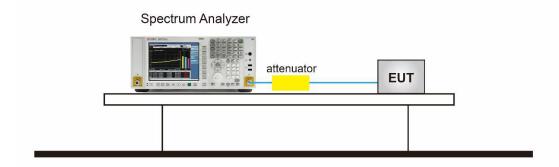
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

8.2 Measurement Procedure

The testing follows the ANSI C63.10 Section 6.10.4 and 7.8.8:

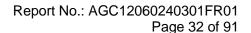
- Reference level measurement
- 1. Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
- 2. RBW = 100kHz
- 3. VBW = 300kHz
- 4. Detector = Peak
- 5. Sweep time = Auto couple
- 6. Trace mode = Max hold
- 7. Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission.
- Emission level measurement
- 1. Span = Wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
- 2. RBW = 100kHz
- 3. VBW = 300kHz
- 4. Detector = Peak
- 5. Sweep time = Auto couple
- 6. Trace mode = Max hold
- 7. Trace was allowed to stabilize
- 8. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

8.3 Measurement Setup (Block Diagram of Configuration)



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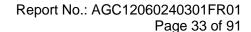
Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/





8.4 Measurement Results





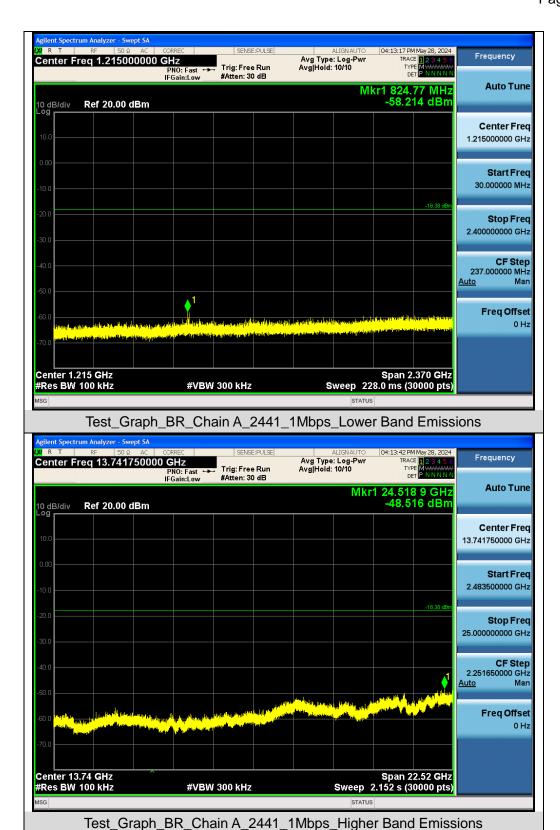








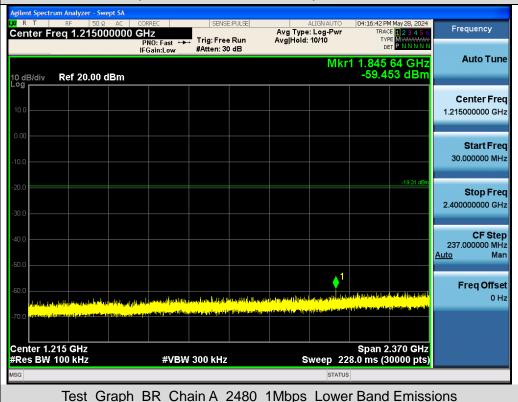


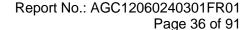








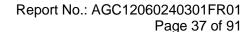




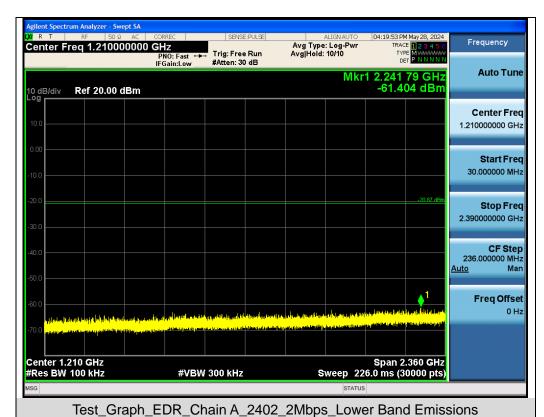










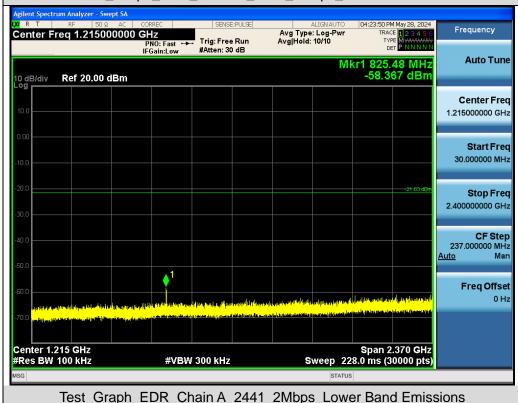










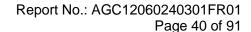




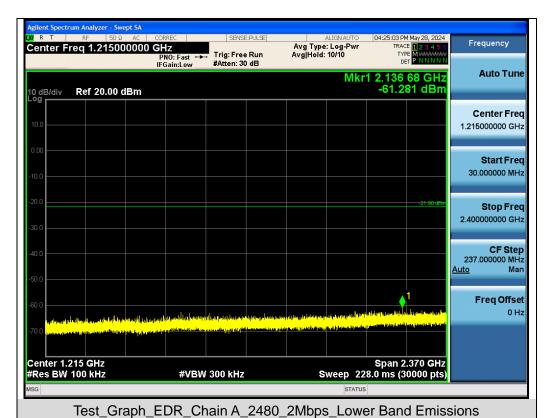




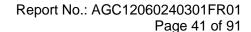






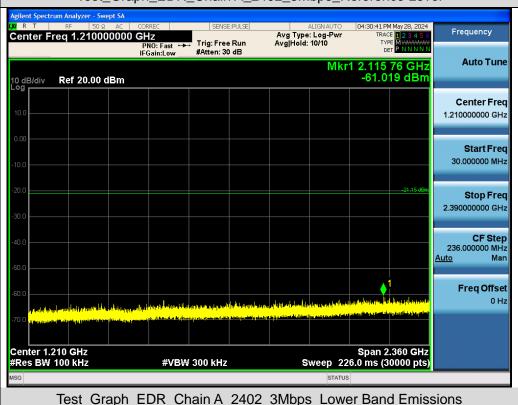


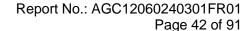








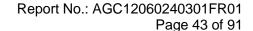




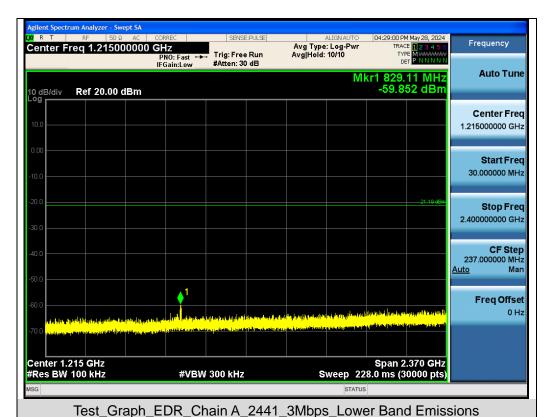




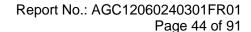






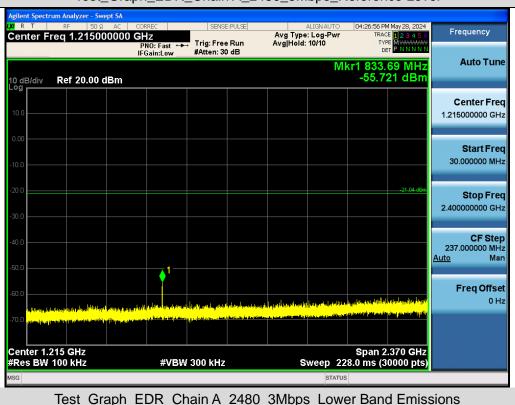


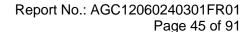




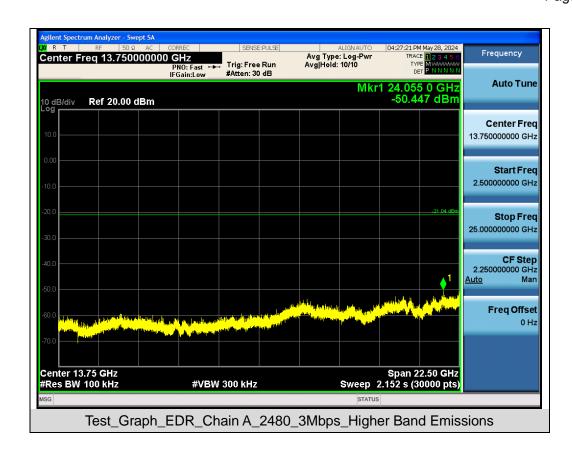


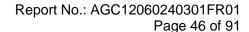






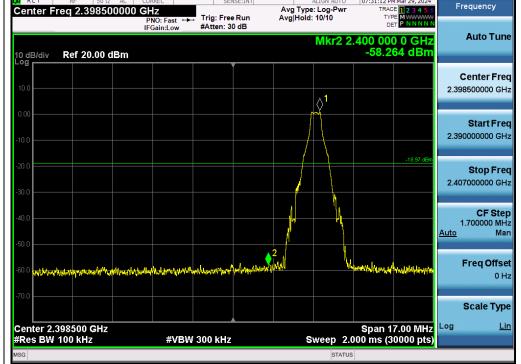


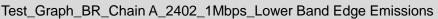


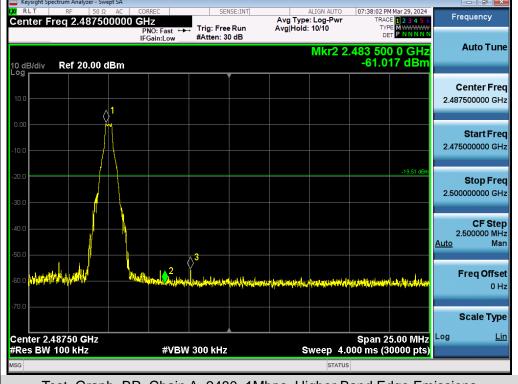




Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands Keysight Spectrum Analyzer - Swept SA RLT RF 50 Q AC CORREC SENSE:INT ALIGN AUTO 07:31:12 PM Mar 29, 2024 Center Freq 2.398500000 GHz PNO: Fast PNO: Fast PNO: Free Run PNO: Fast PNO:







Test_Graph_BR_Chain A_2480_1Mbps_Higher Band Edge Emissions



CF Step 2.500000 MHz

Freq Offset 0 Hz

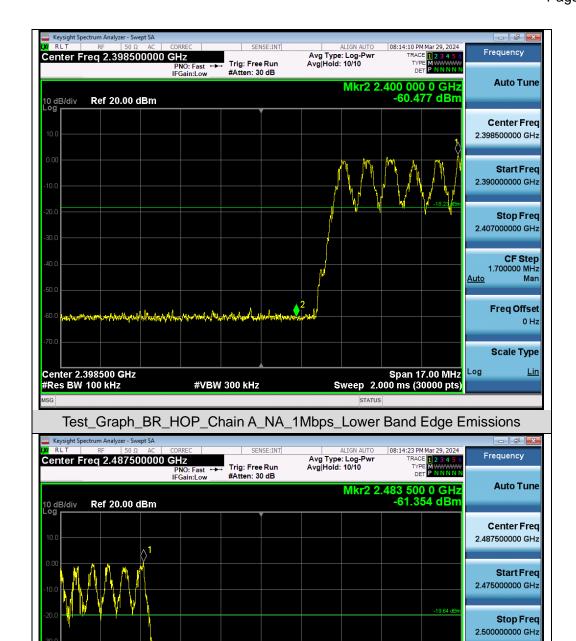
Scale Type

Man

<u>Auto</u>

Span 25.00 MHz Sweep 4.000 ms (30000 pts)





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Test_Graph_BR_HOP_Chain A_NA_1Mbps_Higher Band Edge Emissions

#VBW 300 kHz

Center 2.48750 GHz #Res BW 100 kHz



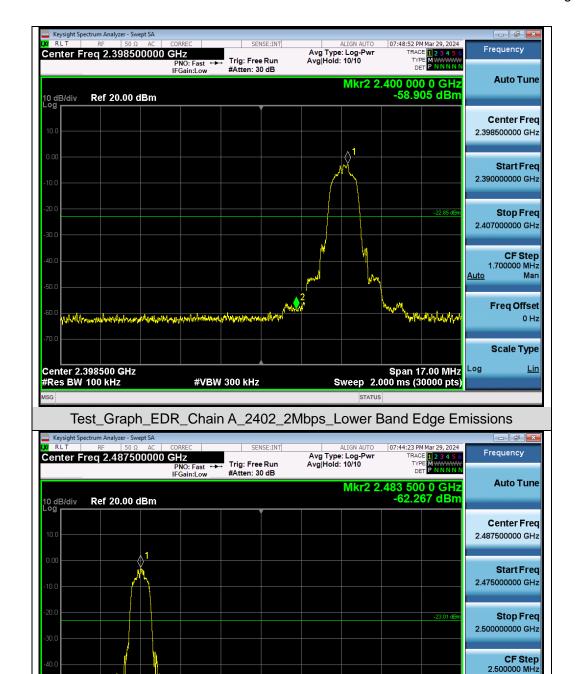
<u>Auto</u>

Span 25.00 MHz Sweep 4.000 ms (30000 pts) Man

Freq Offset 0 Hz

Scale Type



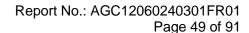


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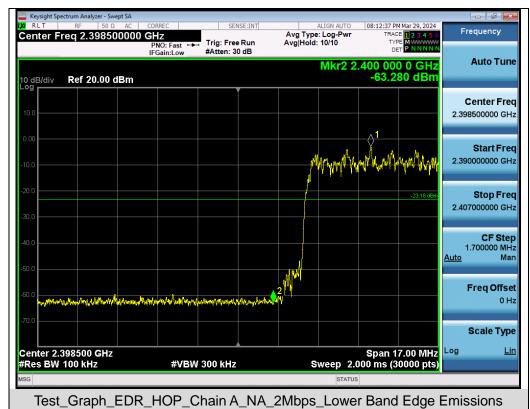
Test Graph EDR Chain A 2480 2Mbps Higher Band Edge Emissions

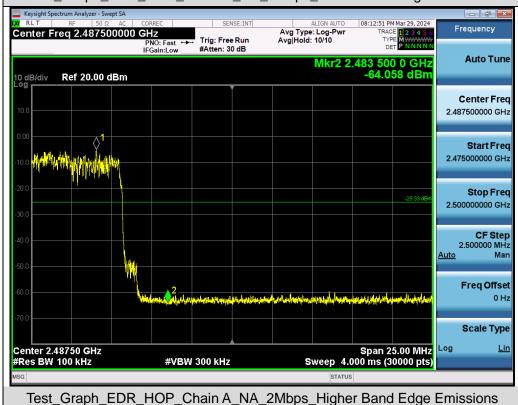
#VBW 300 kHz

Center 2.48750 GHz #Res BW 100 kHz



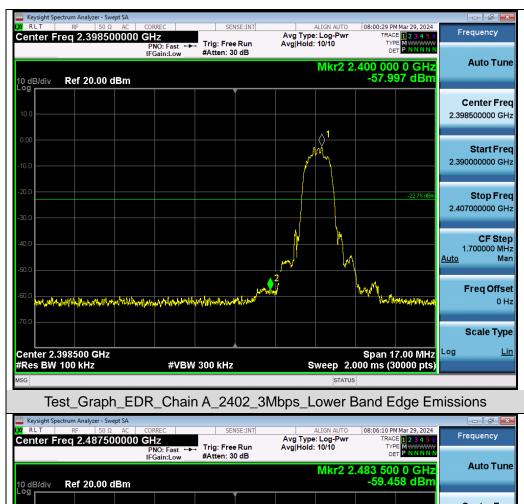


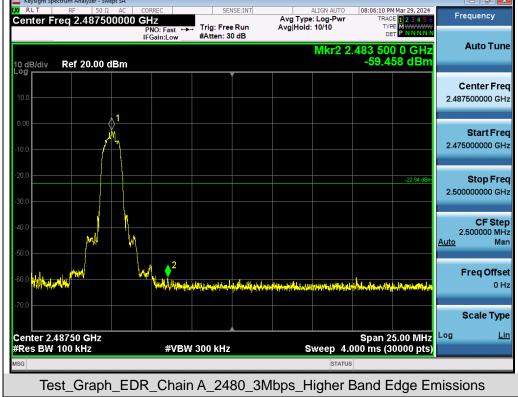


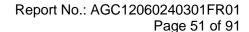




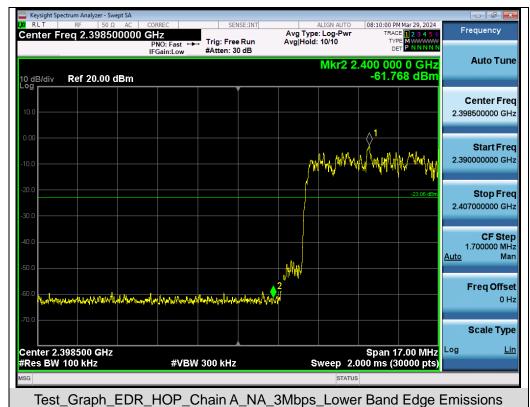


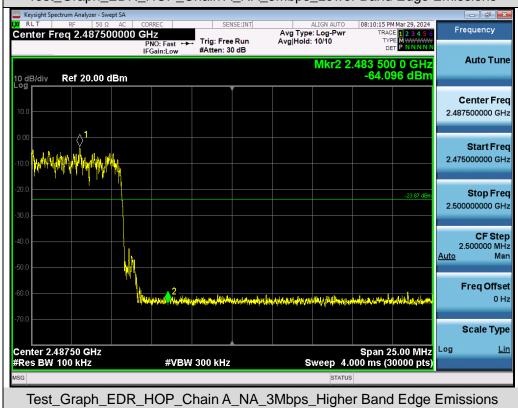














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9. Radiated Spurious Emission

9.1 Measurement Limit

15.209 Limit in the below table has to be followed

Frequencies (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

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

9.2 Measurement Procedure

- 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 emission, 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 RBW and 3MHz VBW for peak reading. 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



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absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

- 8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.

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

Spectrum Parameter	Setting		
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP		
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP		
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP		
Start ~Stop Frequency	1GHz~26.5GHz		
Clart ~ Stop i requency	1MHz/3MHz for Peak, 1MHz/3MHz for Average		

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



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Quasi-Peak Measurements below 1GHz

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. Span was set greater than 1MHz
- 3. RBW = as shown in the table above
- 4. Detector = CISPR quasi-peak
- 5. Sweep time = auto couple
- 6. Trace was allowed to stabilize

Peak Measurements above 1GHz

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW = 3MHz
- 4. Detector = peak
- 5. Sweep time = auto couple
- 6. Trace mode = max hold
- 7. Trace was allowed to stabilize

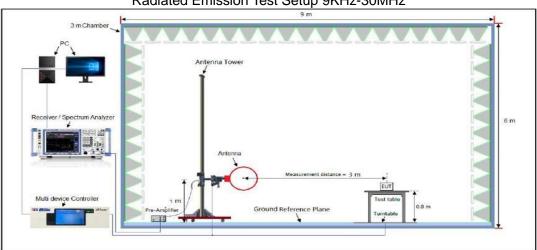
Average Measurements above 1GHz

- 1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
- 2. RBW = 1MHz
- 3. VBW ≥ [3 × RBW]
- 4. Detector = Power averaging (rms)
- 5. Averaging type = power (i.e., rms)
- 6. Sweep time = auto
- 7. Perform a trace average of at least 100 traces.
- 8. The applicable correction factor is [10*log (1 / D)], where D is the duty cycle. The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

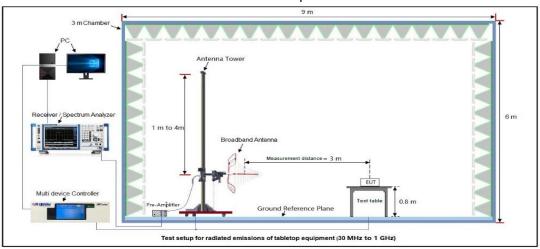


9.3 Measurement Setup (Block Diagram of Configuration)

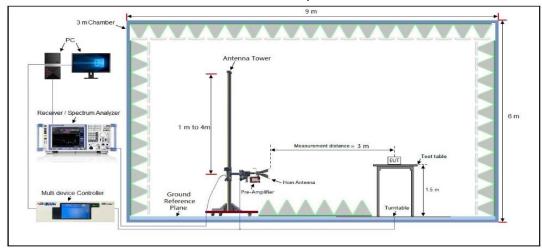
Radiated Emission Test Setup 9KHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



Radiated Emission Test Setup Above 1000MHz



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Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/



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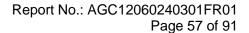
9.4 Measurement Result

Radiated Emission Below 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

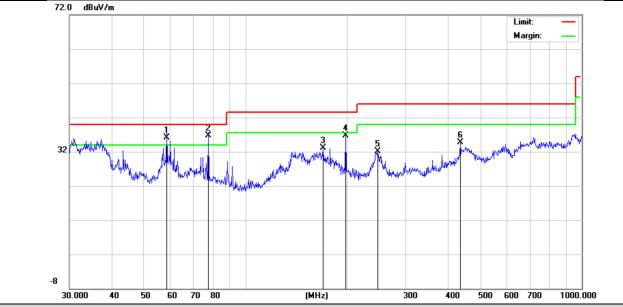
	Radia	ted Emiss	ion Test Resu	Its at 30MHz	z-1GHz		
EUT Name	Mini PC			Model Na	me	AX8 Max	
Temperature	25 ℃			Relative I	lumidity	55.4%	
Pressure	960hPa			Test Volta	age	DC 19V by	adapter 1#
Test Mode	Mode 1			Antenna	Polarity	Horizontal	
72.0 32 -8 30.0	/m/m/m/m/m/m/m/m/m/m/m/m/m/m/m/m/m/m/m	haras Andrew	(MHz)	300		Margin: —	1
Peak Data List	_Peak						
NO. Fred		Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity

Peak D	Peak Data List_Peak							
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	119.8555	40.35	16.40	43.50	3.15	100	160	Horizontal
2	148.4410	30.83	13.98	43.50	12.67	100	170	Horizontal
3	198.5879	33.30	14.34	43.50	10.2	100	90	Horizontal
4	248.5518	33.00	15.14	46.00	13.0	100	220	Horizontal
5	462.3455	32.61	24.09	46.00	13.39	100	160	Horizontal
6	903.3093	37.76	31.34	46.00	8.24	100	140	Horizontal





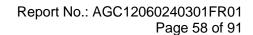
Radiated Emission Test Results at 30MHz-1GHz							
EUT Name	Mini PC	Model Name	AX8 Max				
Temperature	25 ℃	Relative Humidity	55.4%				
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#				
Test Mode	Mode 1	Antenna Polarity	Vertical				



Peak Data List_Peak

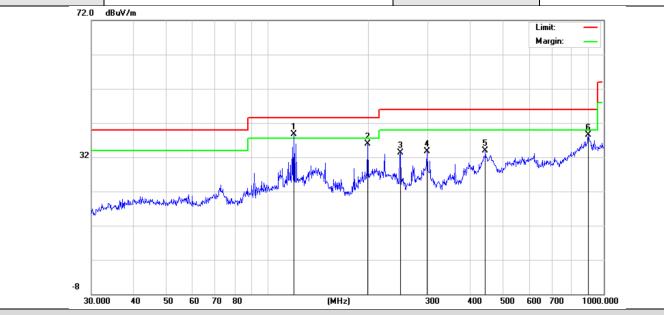
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	58.4074	36.06	17.08	40.00	3.94	100	160	Vertical
2	77.5928	36.74	16.92	40.00	3.26	100	170	Vertical
3	170.1948	33.01	18.35	43.50	10.49	100	90	Vertical
4	198.5880	36.78	17.94	43.50	6.72	100	220	Vertical
5	247.6819	32.17	16.87	46.00	13.83	100	160	Vertical
6	435.5898	34.70	25.39	46.00	11.3	100	140	Vertical

RESULT: Pass



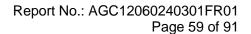


Radiated Emission Test Results at 30MHz-1GHz							
EUT Name	Mini PC	Model Name	AX8 Max				
Temperature	25℃	Relative Humidity	55.4%				
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#				
Test Mode	Mode 1	Antenna Polarity	Horizontal				



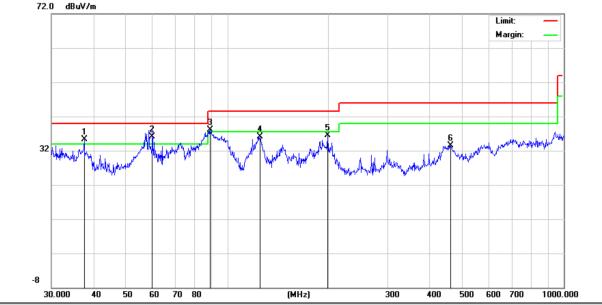
Peak Data List_Peak

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	119.8556	38.66	16.40	43.50	4.84	100	110	Horizontal
2	198.5880	36.00	14.34	43.50	7.5	100	120	Horizontal
3	248.5519	33.25	15.14	46.00	12.75	100	100	Horizontal
4	298.2681	33.69	16.36	46.00	12.31	100	80	Horizontal
5	444.8514	33.81	24.93	46.00	12.19	100	150	Horizontal
6	900.1474	38.42	31.78	46.00	7.58	100	160	Horizontal





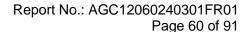
Radiated Emission Test Results at 30MHz-1GHz										
EUT Name	Mini PC	Model Name	AX8 Max							
Temperature	25 ℃	Relative Humidity	55.4%							
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#							
Test Mode	Mode 1	Antenna Polarity	Vertical							
72.0	dBuV/m	72.0 dB ₁ N/m								



Peak Data List_Peak

NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.5479	35.30	16.09	40.00	4.7	100	80	Vertical
2	59.8588	36.02	17.10	40.00	3.98	100	110	Vertical
3	88.9639	38.14	15.69	43.50	5.36	100	180	Vertical
4	125.0066	36.16	17.82	43.50	7.34	100	200	Vertical
5	198.5880	36.43	17.94	43.50	7.07	100	150	Vertical
6	460.7271	33.43	25.15	46.00	12.57	100	120	Vertical

RESULT: Pass

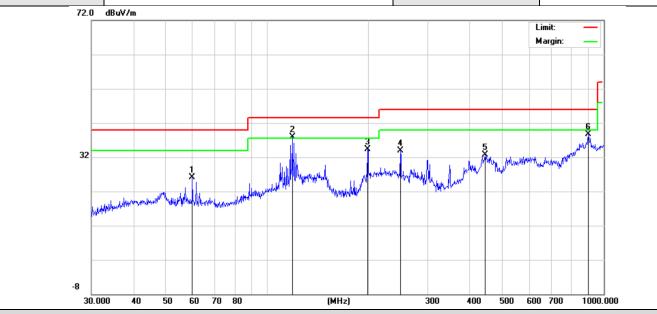




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Radiated Emission Test Results at 30MHz-1GHz							
EUT Name	T Name Mini PC Model Name AX8 Max						
Temperature	25℃	Relative Humidity	55.4%				
Pressure	960hPa	Test Voltage	DC 19V by adapter 3#				
Test Mode	Mode 1	Antenna Polarity	Horizontal				



Peak Data List_Peak Level Factor Limit Margin Height Angle Freq. NO. Polarity [MHz] [dBµV/m] [dB] [dBµV/m] [dB] [cm] 12.51 Horizontal 1 59.8588 26.16 40.00 13.84 100 160 2 118.6014 37.84 16.39 43.50 5.66 100 170 Horizontal Horizontal 3 198.5880 34.32 14.34 43.50 9.18 100 90 4 248.5519 33.87 15.14 46.00 12.13 100 220 Horizontal 5 444.8514 32.67 24.93 46.00 13.33 100 160 Horizontal

46.00

7.21

100

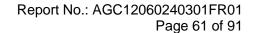
140

Horizontal

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38.79

31.78





			Radia	ted Emiss	ion Test Res	ults at 30MH	z-1GHz		
EUT N	Name	Min	i PC			Model Na	ıme	AX8 Max	
Tempo	erature	25°	C			Relative I	Humidity	55.4%	
Press	ure	960	hPa			Test Volta	age	DC 19V by	adapter 3#
Test N	/lode	Mod	de 1			Antenna	Polarity	Vertical	
	72.0	dBuV/π	1					_imit: —	
	32		***************************************		Name of the second seco	annet house parties		Aargin: —	
Peak [30.00 Data List		10 50 60 70	80	(MHz)	300	400 500 600	700 1000.00	,U
NO.	Freq. [MHz]		Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.000	7	36.40	15.58	40.00	3.6	100	120	Vertical
2	37.416	5	36.72	16.05	40.00	3.28	100	110	Vertical
3	47.994	0	36.02	16.98	40.00	3.98	100	80	Vertical
4	59.858	8	35.57	17.10	40.00	4.43	100	200	Vertical
5	67.438	2	35.00	17.03	40.00	5.0	100	150	Vertical
6	178.758	84	35.18	18.48	43.50	8.32	100	160	Vertical

RESULT: Pass

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

2. All test modes had been pre-tested. The mode 1 is the worst case and recorded in the report.



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Radiated Emissions Test Results Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 1	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4804.000	50.25	0.08	50.33	74.00	-23.67	peak
4804.000	40.33	0.08	40.41	54.00	-13.59	AVG
7206.000	49.31	2.21	51.52	74.00	-22.48	peak
7206.000	40.22	2.21	42.43	54.00	-11.57	AVG
Domork:		<u> </u>	<u> </u>		<u> </u>	

Remark

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 1	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4804.000	49.63	0.08	49.71	74.00	-24.29	peak
4804.000	41.25	0.08	41.33	54.00	-12.67	AVG
7206.000	50.22	2.21	52.43	74.00	-21.57	peak
7206.000	39.63	2.21	41.84	54.00	-12.16	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results for Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 2	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.000	50.26	0.08	50.34	74.00	-23.66	peak
4882.000	39.21	0.08	39.29	54.00	-14.71	AVG
7323.000	49.33	2.21	51.54	74.00	-22.46	peak
7323.000	40.25	2.21	42.46	54.00	-11.54	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 2	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.000	51.36	0.08	51.44	74.00	-22.56	peak
4882.000	39.14	0.08	39.22	54.00	-14.78	AVG
7323.000	48.33	2.21	50.54	74.00	-23.46	peak
7323.000	38.52	2.21	40.73	54.00	-13.27	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results for Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 3	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4960.000	50.25	0.22	50.47	74.00	-23.53	peak
4960.000	39.33	0.22	39.55	54.00	-14.45	AVG
7440.000	49.74	2.64	52.38	74.00	-21.62	peak
7440.000	40.12	2.64	42.76	54.00	-11.24	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 3	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)]
4960.000	49.63	0.22	49.85	74.00	-24.15	peak
4960.000	38.41	0.22	38.63	54.00	-15.37	AVG
7440.000	48.31	2.64	50.95	74.00	-23.05	peak
7440.000	39.22	2.64	41.86	54.00	-12.14	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#
Test Mode	Mode 1	Antenna Polarity	Horizontal

(MHz) (dBμV) (dB) (dBμV/m) (dBμV/m) (dB) 4804.000 51.22 0.08 51.3 74.00 -22.70 peak 4804.000 38.15 0.08 38.23 54.00 -15.77 AVG 7206.000 50.26 2.21 52.47 74.00 -21.53 peak	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
4804.000 38.15 0.08 38.23 54.00 -15.77 AVG	(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
	4804.000	51.22	0.08	51.3	74.00	-22.70	peak
7206.000 50.26 2.21 52.47 74.00 -21.53 peak	4804.000	38.15	0.08	38.23	54.00	-15.77	AVG
	7206.000	50.26	2.21	52.47	74.00	-21.53	peak
7206.000 39.24 2.21 41.45 54.00 -12.55 AVG	7206.000	39.24	2.21	41.45	54.00	-12.55	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#
Test Mode	Mode 1	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4804.000	48.15	0.08	48.23	74.00	-25.77	peak
4804.000	39.34	0.08	39.42	54.00	-14.58	AVG
7206.000	49.35	2.21	51.56	74.00	-22.44	peak
7206.000	38.41	2.21	40.62	54.00	-13.38	AVG
Remark:	<u> </u>		·			

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results for Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#
Test Mode	Mode 2	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.000	49.63	0.08	49.71	74.00	-24.29	peak
4882.000	41.25	0.08	41.33	54.00	-12.67	AVG
7323.000	48.51	2.21	50.72	74.00	-23.28	peak
7323.000	39.34	2.21	41.55	54.00	-12.45	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#
Test Mode	Mode 2	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.000	48.93	0.08	49.01	74.00	-24.99	peak
4882.000	42.34	0.08	42.42	54.00	-11.58	AVG
7323.000	49.15	2.21	51.36	74.00	-22.64	peak
7323.000	38.17	2.21	40.38	54.00	-13.62	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results for Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#
Test Mode	Mode 3	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4960.000	50.26	0.22	50.48	74.00	-23.52	peak
4960.000	39.34	0.22	39.56	54.00	-14.44	AVG
7440.000	49.63	2.64	52.27	74.00	-21.73	peak
7440.000	38.77	2.64	41.41	54.00	-12.59	AVG
D = == = = = = = =	00.77	2.01		01.00	12.00	7

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 2#
Test Mode	Mode 3	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	7.
4960.000	51.26	0.22	51.48	74.00	-22.52	peak
4960.000	39.63	0.22	39.85	54.00	-14.15	AVG
7440.000	48.63	2.64	51.27	74.00	-22.73	peak
7440.000	39.16	2.64	41.8	54.00	-12.20	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 3#
Test Mode	Mode 1	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4804.000	51.21	0.08	51.29	74.00	-22.71	peak
4804.000	41.89	0.08	41.97	54.00	-12.03	AVG
7206.000	49.33	2.21	51.54	74.00	-22.46	peak
7206.000	40.52	2.21	42.73	54.00	-11.27	AVG
Domorle			•			•

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 3#
Test Mode	Mode 1	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4804.000	50.69	0.08	50.77	74.00	-23.23	peak
4804.000	40.33	0.08	40.41	54.00	-13.59	AVG
7206.000	48.74	2.21	50.95	74.00	-23.05	peak
7206.000	39.24	2.21	41.45	54.00	-12.55	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results for Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 3#
Test Mode	Mode 2	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.000	51.33	0.08	51.41	74.00	-22.59	peak
4882.000	40.15	0.08	40.23	54.00	-13.77	AVG
7323.000	48.37	2.21	50.58	74.00	-23.42	peak
7323.000	41.45	2.21	43.66	54.00	-10.34	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 3#
Test Mode	Mode 2	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4882.000	51.39	0.08	51.47	74.00	-22.53	peak
4882.000	41.33	0.08	41.41	54.00	-12.59	AVG
7323.000	49.42	2.21	51.63	74.00	-22.37	peak
7323.000	41.11	2.21	43.32	54.00	-10.68	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass



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Radiated Emissions Test Results for Above 1GHz

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 3#
Test Mode	Mode 3	Antenna Polarity	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4960.000	51.26	0.22	51.48	74.00	-22.52	peak
4960.000	41.39	0.22	41.61	54.00	-12.39	AVG
7440.000	49.37	2.64	52.01	74.00	-21.99	peak
7440.000	40.28	2.64	42.92	54.00	-11.08	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 3#
Test Mode	Mode 3	Antenna Polarity	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	
4960.000	50.28	0.22	50.5	74.00	-23.50	peak
4960.000	40.39	0.22	40.61	54.00	-13.39	AVG
7440.000	48.77	2.64	51.41	74.00	-22.59	peak
7440.000	41.01	2.64	43.65	54.00	-10.35	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.

RESULT: Pass

Note:

- 1. The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
- 2. Factor = Antenna Factor + Cable loss Pre-amplifier gain, Margin = Emission Level-Limit.
- 3. The "Factor" value can be calculated automatically by software of measurement system.
- 4. All modulations are pre-tested, and only the spurious GFSK modulation with frequencies above 1GHz is r

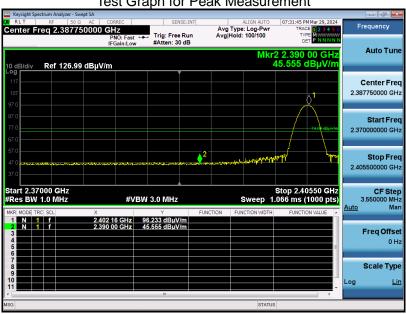
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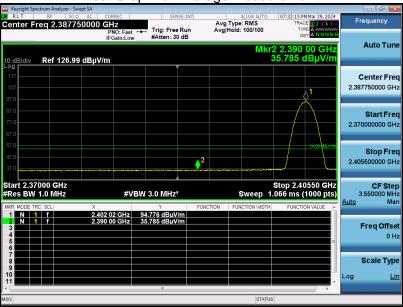


EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 1	Antenna Polarity	Horizontal

Test Graph for Peak Measurement







RESULT: Pass

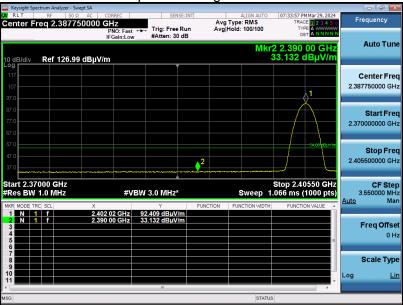


EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 1	Antenna Polarity	Vertical

Test Graph for Peak Measurement







RESULT: Pass

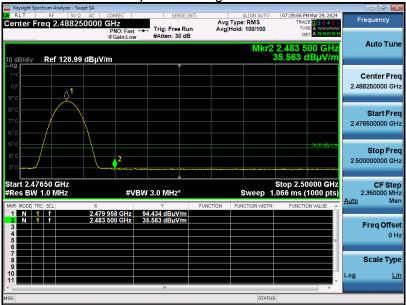


EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 3	Antenna Polarity	Horizontal

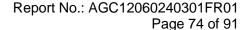
Test Graph for Peak Measurement







RESULT: Pass



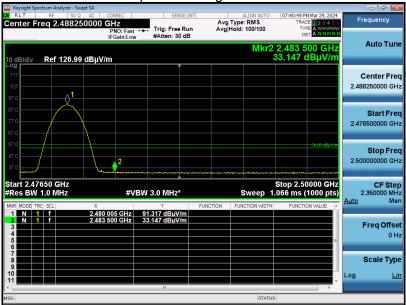


EUT Name	Mini PC	Model Name	AX8 Max
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	DC 19V by adapter 1#
Test Mode	Mode 3	Antenna Polarity	Vertical

Test Graph for Peak Measurement







RESULT: Pass

Note: 1. The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

2. All mode rates are tested and evaluated, GFSK modulated mode is the worst case and documented in the report.



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10. Number of Hopping Frequency Measurement

10.1 Provisions Applicable

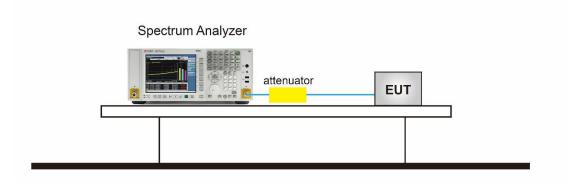
This frequency hopping system must employ a minimum of 15 hopping channels.

10.2 Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

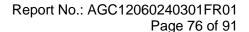
- 1. Span = The frequency band of operation. Depending on the number of channels the device
- 2. supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
- 3. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
- 4. VBW ≥ RBW
- 5. Sweep time = Auto couple
- 6. Detector = Peak
- 7. Trace mode = Max hold
- 8. Allow the trace to stabilize

10.3 Measurement Setup (Block Diagram of Configuration)



10.4 Measurement Result

Test Data of Number of Hopping Frequency				
Test Mode	Number of Hopping Frequency	Limits	Pass or Fail	
GFSK Hopping	79	>=15	Pass	





Frequency Avg Type: Log-Pwr Avg|Hold: 100/100 Trig: Free Run #Atten: 40 dB **Auto Tune** Mkr1 2.420 90 GHz 3.262 dBm I0 dB/div Ref 30.00 dBm Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz **CF Step** 8.350000 MHz **Freq Offset** 0 Hz Scale Type Center 2.44175 GHz #Res BW 200 kHz Span 83.50 MHz Sweep 1.998 ms (1000 pts) Log **#VBW** 620 kHz Test_Graph_BR_HOP_Chain A_NA_1Mbps_Number of Hopping

Test Graphs of Number of Hopping Frequency

Note: All mode rates are tested and evaluated, GFSK modulated DH5 mode is the worst case and documented in the report.