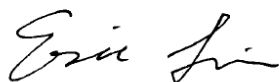


# TEST REPORT

**Application No.:** KSCR2201000028AT  
**FCC ID:** 2ADTD-DS-D5B55  
**IC:** 20199-DSD5B55  
**Applicant:** Hangzhou Hikvision Digital Technology Co., Ltd.  
**Address of Applicant:** No.555 Qianmo Road, Binjiang District Hangzhou 310052, China  
**Manufacturer:** Hangzhou Hikvision Digital Technology Co., Ltd.  
**Address of Manufacturer:** No.555 Qianmo Road, Binjiang District Hangzhou 310052, China  
**Factory:** 1. Hangzhou Hikvision Technology Co., Ltd.  
 2. Hangzhou Hikvision Electronics Co., Ltd.  
 3. Hangzhou Hikvision Digital Technology Co., Ltd.  
 4. Chongqing Hikvision technology Co., LTD  
**Address of Factory:** 1. No.700, Dongliu Road, Binjiang District, Hangzhou City, Zhejiang, 310052, China;  
 2. No.299, Qiushi Road, Tonglu Economic Development Zone, Tonglu County, Hangzhou, Zhejiang, 310052, China  
 3. No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China  
 4. NO.118, Haikang Road, Area C, Jianqiao Industrial Park, Dadukou District, Chongqing, 401325, China.  
**Equipment Under Test (EUT):**  
**EUT Name:** Interactive Tablets  
**Model No.:** Refer to page 2~3  
 Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.  
**Trade mark:** HIKVISION  
**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:** 2022-01-05  
**Date of Test:** 2022-03-07 to 2022-03-10  
**Date of Issue:** 2022-03-12  

<b>Test Result:</b>	<b>Pass*</b>
---------------------	--------------

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



Eric Lin  
Laboratory Manager



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## Model No:

DS-D5B55RB/A;DS-D5B55RB/B;DS-D5B55RB/C;DS-D5B55RD/A;DS-D5B55RD/B;DS-D5B55RD/C;DS-D5B55RO/A;DS-D5B55RO/B;DS-D5B55RO/C;DS-D5B55RG/A;DS-D5B55RG/B;DS-D5B55RG/C;DS-D5B55RM/A;DS-D5B55RM/B;DS-D5B55RM/C;DS-D5B55JRX;DS-D5B55JRY;DS-D5B55JRZ;DS-D5B55NYX;DS-D5B55NYY;DS-D5B55NYZ;DS-D5B55ZFX;DS-D5B55ZFY;DS-D5B55ZfZ;DS-D5B55GAX;DS-D5B55GAY;DS-D5B55GAZ;DS-D5B55DCX;DS-D5B55DCY;DS-D5B55DCZ;DS-D5B55RB/ZC;DS-D5B55RD/ZC;DS-D5B55XX/ZC;DS-D5B55RD/AO;DS-D5B55RD/AP;DS-D5B55RB/AO;DS-D5B55RB/AP;DS-D5B55RD/BO;DS-D5B55RD/BP;DS-D5B55RB/BO;DS-D5B55RB/BP;DS-D5B55MD/AO;DS-D5B55MD/AP;DS-D5B55MB/AO;DS-D5B55MB/AP;DS-D5B55MD/BO;DS-D5B55MD/BP;DS-D5B55MB/BO;DS-D5B55MB/BP;DS-D5B55CD/AO;DS-D5B55CD/AP;DS-D5B55CB/AO;DS-D5B55CB/AP;DS-D5B55CD/BO;DS-D5B55CD/BP;DS-D5B55CB/BO;DS-D5B55CB/BP;DS-D5B55FD/AO;DS-D5B55FD/AP;DS-D5B55FB/AO;DS-D5B55FB/AP;DS-D5B55FD/BO;DS-D5B55FD/BP;DS-D5B55FB/BO;DS-D5B55FB/BP;DS-D5B55FD/B;DS-D5B55FB/B;DS-D5C55RB/A;DS-D5C55RB/B;DS-D5C55RB/C;DS-D5C55RD/A;DS-D5C55RD/B;DS-D5C55RD/C;DS-D5C55RO/A;DS-D5C55RO/B;DS-D5C55RO/C;DS-D5C55RG/A;DS-D5C55RG/B;DS-D5C55RG/C;DS-D5C55RM/A;DS-D5C55RM/B;DS-D5C55RM/C;DS-D5C55JRX;DS-D5C55JRY;DS-D5C55JRZ;DS-D5C55NYX;DS-D5C55NYY;DS-D5C55NYZ;DS-D5C55ZFX;DS-D5C55ZFY;DS-D5C55ZfZ;DS-D5C55GAX;DS-D5C55GAY;DS-D5C55GAZ;DS-D5C55DCX;DS-D5C55DCY;DS-D5C55DCZ;DS-D5C55RB/ZC;DS-D5C55RD/ZC;DS-D5C55XX/ZC;DS-D5C55RD/AO;DS-D5C55RD/AP;DS-D5C55RB/AO;DS-D5C55RB/AP;DS-D5C55RD/BO;DS-D5C55RD/BP;DS-D5C55RB/BO;DS-D5C55RB/BP;DS-D5C55MD/AO;DS-D5C55MD/AP;DS-D5C55MB/AO;DS-D5C55MB/AP;DS-D5C55MD/BO;DS-D5C55MD/BP;DS-D5C55MB/BO;DS-D5C55MB/BP;DS-D5C55CD/AO;DS-D5C55CD/AP;DS-D5C55CB/AO;DS-D5C55CB/AP;DS-D5C55CD/BO;DS-D5C55CD/BP;DS-D5C55CB/BO;DS-D5C55CB/BP;DS-D5C55FD/AO;DS-D5C55FD/AP;DS-D5C55FB/AO;DS-D5C55FB/AP;DS-D5C55FD/BO;DS-D5C55FD/BP;DS-D5C55FB/BO;DS-D5C55FB/BP;DS-D5C55FD/B;DS-D5C55FB/B;DS-D5D55RB/A;DS-D5D55RB/B;DS-D5D55RB/C;DS-D5D55RD/A;DS-D5D55RD/B;DS-D5D55RD/C;DS-D5D55RO/A;DS-D5D55RO/B;DS-D5D55RO/C;DS-D5D55RG/A;DS-D5D55RG/B;DS-D5D55RG/C;DS-D5D55RM/A;DS-D5D55RM/B;DS-D5D55RM/C;DS-D5D55JRX;DS-D5D55JRY;DS-D5D55JRZ;DS-D5D55NYX;DS-D5D55NYY;DS-D5D55NYZ;DS-D5D55ZFX;DS-D5D55ZFY;DS-D5D55ZfZ;DS-D5D55GAX;DS-D5D55GAY;DS-D5D55GAZ;DS-D5D55DCX;DS-D5D55DCY;DS-D5D55DCZ;DS-D5D55RB/ZC;DS-D5D55RD/ZC;DS-D5D55XX/ZC;DS-D5D55RD/AO;DS-D5D55RD/AP;DS-D5D55RB/AO;DS-D5D55RB/AP;DS-D5D55RD/BO;DS-D5D55RD/BP;DS-D5D55RB/BO;DS-D5D55RB/BP;DS-D5D55MD/AO;DS-D5D55MD/AP;DS-D5D55MB/AO;DS-D5D55MB/AP;DS-D5D55MD/BO;DS-D5D55MD/BP;DS-D5D55MB/BO;DS-D5D55MB/BP;DS-D5D55CD/AO;DS-D5D55CD/AP;DS-D5D55CB/AO;DS-D5D55CB/AP;DS-D5D55CD/BO;DS-D5D55CD/BP;DS-D5D55CB/BO;DS-D5D55CB/BP;DS-D5D55FD/AO;DS-D5D55FD/AP;DS-D5D55FB/AO;DS-D5D55FB/AP;DS-D5D55FD/BO;DS-D5D55FD/BP;DS-D5D55FB/BO;DS-D5D55FB/BP;DS-D5D55FD/B;DS-D5D55FB/B;DS-D5F55RB/A;DS-D5F55RB/B;DS-D5F55RB/C;DS-D5F55RD/A;DS-D5F55RD/B;DS-D5F55RD/C;DS-D5F55RO/A;DS-D5F55RO/B;DS-D5F55RO/C;DS-D5F55RG/A;DS-D5F55RG/B;DS-D5F55RG/C;DS-D5F55RM/A;DS-D5F55RM/B;DS-D5F55RM/C;DS-D5F55JRX;DS-D5F55JRY;DS-D5F55JRZ;DS-D5F55NYX;DS-D5F55NYY;DS-D5F55NYZ;DS-D5F55ZFX;DS-D5F55ZFY;DS-D5F55ZfZ;DS-D5F55GAX;DS-D5F55GAY;DS-D5F55GAZ;DS-D5F55DCX;DS-D5F55DCY;DS-D5F55DCZ;DS-D5F55RB/ZC;DS-D5F55RD/ZC;DS-D5F55XX/ZC;DS-D5F55RD/AO;DS-D5F55RD/AP;DS-D5F55RB/AO;DS-D5F55RB/AP;DS-D5F55RD/BO;DS-D5F55RD/BP;DS-D5F55RB/BO;DS-D5F55RB/BP;DS-D5F55MD/AO;DS-D5F55MD/AP;DS-D5F55MB/AO;DS-D5F55MB/AP;DS-D5F55MD/BO;DS-D5F55MD/BP;DS-D5F55MB/BO;DS-D5F55MB/BP;DS-D5F55CD/AO;DS-D5F55CD/AP;DS-D5F55CB/AO;DS-D5F55CB/AP;DS-D5F55CD/BO;DS-D5F55CD/BP;DS-D5F55CB/BO;DS-D5F55CB/BP;DS-D5F55FD/AO;DS-D5F55FD/AP;DS-D5F55FB/AO;DS-D5F55FB/AP;DS-D5F55FD/BO;DS-D5F55FD/BP;DS-D5F55FB/BO;DS-D5F55FB/BP;DS-D5F55FD/B;DS-D5A55RB/A;DS-D5A55RB/B;DS-D5A55RB/C;DS-D5A55RD/A;DS-D5A55RD/B;DS-D5A55RD/C;DS-D5A55RO/A;DS-D5A55RO/B;DS-D5A55RO/C;DS-D5A55RG/A;DS-D5A55RG/B;DS-D5A55RG/C;DS-D5A55RM/A;DS-D5A55RM/B;DS-D5A55RM/C;DS-D5A55JRX;DS-D5A55JRY;DS-D5A55JRZ;DS-D5A55NYX;DS-D5A55NYY;DS-D5A55NYZ;DS-D5A55ZFX;DS-D5A55ZFY;DS-D5A55ZfZ;DS-D5A55GAX;DS-D5A55GAY;DS-D5A55GAZ;DS-D5A55DCX;DS-D5A55DCY;DS-



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**For IC Model No.:**

DS-D5B55RB/A , DS-D5B55RB/B



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Revision Record			
Version	Description	Date	Remark
00	Original	2022-03-12	/

Authorized for issue by:			
		<i>Tommie Tang</i>	
		Tommie.Tang / Project Engineer	
		<i>Eric Lin</i>	
		Eric Lin / Reviewer	





## 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 15.207	RSS-Gen Section 8.8	ANSI C63.10 (2013) Section 6.2	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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**Declaration of EUT Family Grouping:**

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model DS-D5B55RB/A was tested since their differences were the model number and appearance.



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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	AC100-240V 50/60Hz
Test voltage:	AC 120V/60Hz
Antenna Gain:	5.19dBi (Provided by the manufacturer)
Antenna Type:	PCB Antenna
Bluetooth Version:	V5.0 Dual mode
Channel Spacing:	1MHz
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Operation Frequency:	2402MHz to 2480MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Firmware Version:	V2.0.0 build210406
S/N:	G15774843

### 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	N/A	N/A
SecureCRT	VanDyke	V 6.2.0	/
Serial port adapter plate	/	Test Plate 3	/



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#### 4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$8.4 \times 10^{-8}$
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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t:(86-512)57355888 f:(86-512)57370818 sgs.china@sgs.com

#### 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.

#### 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

None

#### 4.8 Abnormalities from Standard Conditions

None



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## 5 Equipment List

Item	Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal. Due Date
<b>Conducted Emission at Mains Terminals (150kHz-30MHz)</b>						
1	EMI Test Receive	R&S	ESCI	100781	01/22/2022	01/21/2023
2	LISN	R&S	ENV216	101604	10/12/2021	10/11/2022
3	LISN	Schwarzbeck	NNLK 8129	8129-143	10/12/2021	10/11/2022
4	Pulse Limiter	R&S	ESH3-Z2	100609	01/22/2022	01/21/2023
5	CE test Cable	Thermax	/	14	10/16/2021	10/15/2022
6	Test Software	Faratronic	EZ-EMC	CCS-03A1	N.C.R	N.C.R
<b>RF Conducted Test</b>						
1	Spectrum Analyzer	Agilent	E4446A	MY44020154	04/16/2021	04/15/2022
2	Spectrum Analyzer	Keysight	N9020A	MY55370209	10/11/2021	10/10/2022
4	Signal Generator	Agilent	N5182A	MY50142015	08/27/2021	08/26/2022
5	Spectrum Analyzer	Keysight	N9030B	MY61330164	01/22/2022	01/21/2023
6	Vector Signal Generator	R&S	SMW200A	110074	10/12/2021	10/11/2022
7	Radio Communication Test Station	Anritsu	MT8000A	6262012849	09/23/2021	09/22/2022
8	Radio Communication Analyzer	Anritsu	MT8821C	6201692222	09/23/2021	09/22/2022
9	Universal Radio Communication Tester	R&S	CMW500	159275	10/12/2021	10/11/2022
10	Universal Radio Communication Tester	R&S	CMW500	167239	04/16/2021	04/15/2022
11	Power Meter	Anritsu	ML2495A	1445010	04/15/2021	04/14/2022
12	Switcher	CCSRF	FY562	KUS2001M001-3	10/12/2021	10/11/2022
13	AC Power Source	EXTECH	6605	1570106	N.C.R	N.C.R
14	DC Power Supply	Agilent	E3632A	MY50340053	N.C.R	N.C.R
15	6dB Attenuator	Mini-Circuits	NAT-6-2W	15542-1	N.C.R	N.C.R
16	Power Divider	AISI	IOWOPE2068	PE2068	N.C.R	N.C.R
17	Filter	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
18	Conducted Test Cable	/	RF01-RF04	/	04/15/2021	04/14/2022
19	Software	BST	TST-PASS	N/A	N/A	N/A
20	Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	04/15/2021	04/14/2022
21	Thermometer	Anymetre	TH603	CCS007	10/14/2021	10/13/2022
<b>RF Radiated Test</b>						
1	Spectrum Analyzer	R&S	FSV40	101493	10/11/2021	10/10/2022
2	Signal Generator	Agilent	E8257C	MY43321570	10/18/2021	10/17/2022
3	Loop Antenna	Com-Power	AL-130R	10160008	04/13/2021	04/12/2023
4	Bilog Antenna	TESEQ	CBL 6112D	35403	06/21/2021	06/20/2023
5	Bilog Antenna	SCHWARZBECK	VULB9160	9160-3342	04/13/2021	04/12/2023
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	267	10/26/2020	10/25/2022
7	Horn-antenna(1-18GHz)	ETS-LINDGREN	3117	00143290	02/22/2021	02/21/2023
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	BBHA9170171	02/20/2022	02/19/2023
9	Pre-Amplifier(30MHz~18GHz)	LNA	/	/	04/15/2021	04/14/2022
10	Amplifier(18~40GHz)	COM-POWER	PAM-840A	461332	10/18/2021	10/17/2022
11	Low Pass Filter	MICRO-TRONICS	VLFX-950	RV142900829	N.C.R	N.C.R
12	High Pass Filter	Mini-Circuits	VHF-1200	15542	N.C.R	N.C.R
13	Filter (5450MHz~5770 MHz)	MICRO-TRONICS	BRC50704-01	2	N.C.R	N.C.R
14	Filter (5690 MHz~5930 MHz)	MICRO-TRONICS	BRC50705-01	4	N.C.R	N.C.R



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15	Filter (5150 MHz~5350 MHz)	MICRO-TRONICS	BRC50703-01	2	N.C.R	N.C.R
16	Filter (885 MHz~915 MHz)	MICRO-TRONICS	BRM14698	1	N.C.R	N.C.R
17	Filter (815 MHz~860 MHz)	MICRO-TRONICS	BRM14697	1	N.C.R	N.C.R
18	Filter (1745 MHz~1910 MHz)	MICRO-TRONICS	BRM14700	1	N.C.R	N.C.R
19	Filter (1922 MHz~1977 MHz)	MICRO-TRONICS	BRM50715	1	N.C.R	N.C.R
20	Filter (2550 MHz)	MICRO-TRONICS	HPM13362	5	N.C.R	N.C.R
21	Filter (1532 MHz~1845 MHz)	MICRO-TRONICS	BRM50713	1	N.C.R	N.C.R
22	Filter (2.4GHz)	MICRO-TRONICS	BRM50701	5	N.C.R	N.C.R
23	RE test cable	/	RE01-RE04	/	04/15/2021	04/14/2022
24	Software	Faratronic	EZ EMC	N/A	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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 5.19dBi.

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:  $2^9 - 1 = 511$  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 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.



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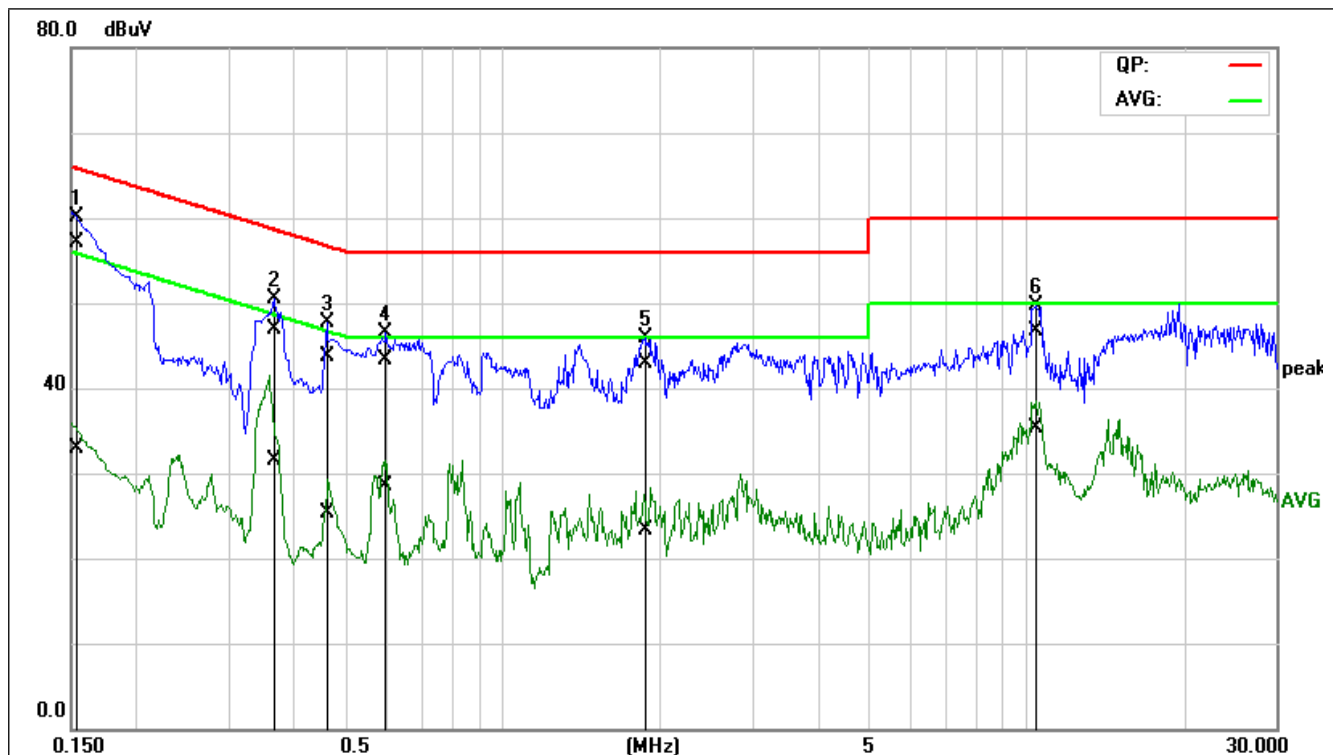
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Mode:e; Line:Live Line



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*	0.1547	37.64	13.33	19.50	57.14	32.83	65.74	55.74	-8.60	-22.91	Pass
2	0.3660	27.32	11.98	19.53	46.85	31.51	58.59	48.59	-11.74	-17.08	Pass
3	0.4620	24.14	5.74	19.55	43.69	25.29	56.66	46.66	-12.97	-21.37	Pass
4	0.5980	23.69	8.99	19.56	43.25	28.55	56.00	46.00	-12.75	-17.45	Pass
5	1.8700	23.21	3.70	19.64	42.85	23.34	56.00	46.00	-13.15	-22.66	Pass
6	10.4860	26.66	15.32	20.05	46.71	35.37	60.00	50.00	-13.29	-14.63	Pass



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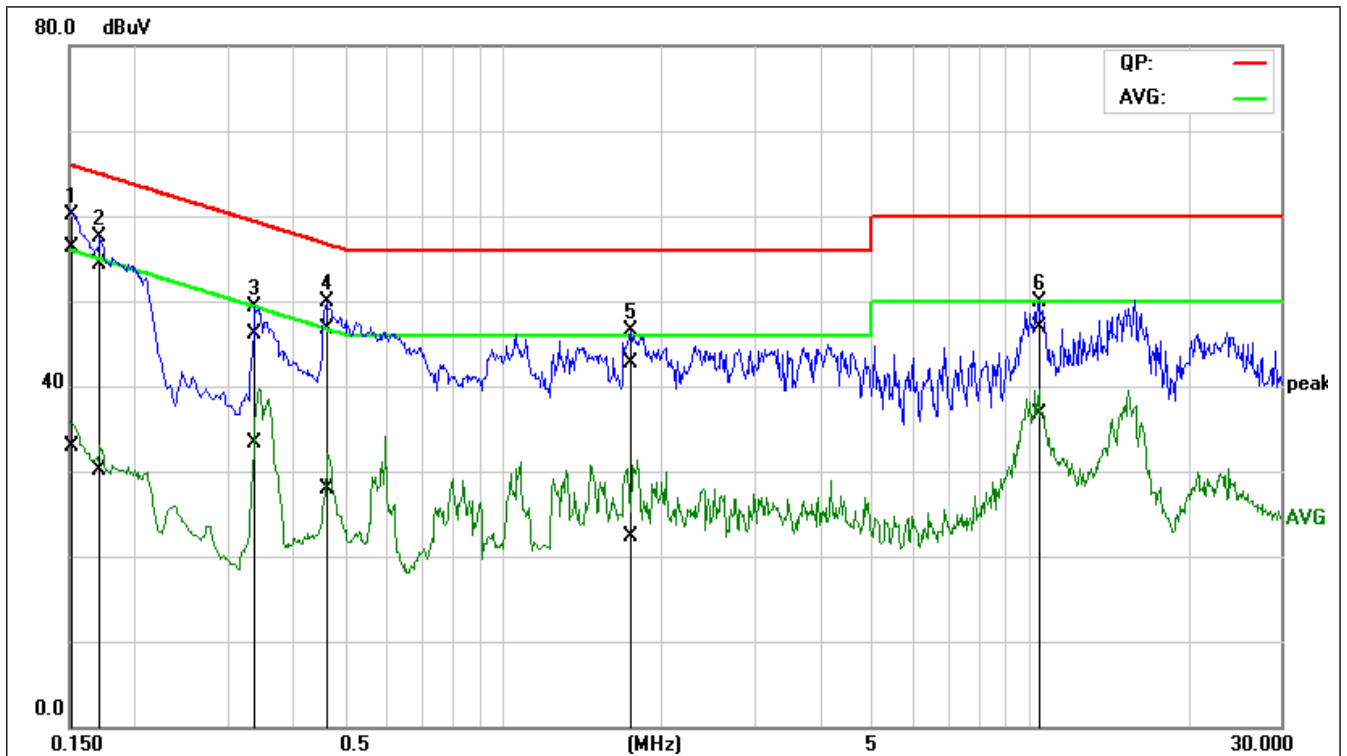
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Mode:e; Line:Neutral Line



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*	0.1540	36.88	13.44	19.48	56.36	32.92	65.78	55.78	-9.42	-22.86	Pass
2	0.1711	34.91	10.67	19.48	54.39	30.15	64.90	54.91	-10.51	-24.76	Pass
3	0.3380	26.51	13.87	19.51	46.02	33.38	59.25	49.25	-13.23	-15.87	Pass
4	0.4620	27.22	8.41	19.55	46.77	27.96	56.66	46.66	-9.89	-18.70	Pass
5	1.7500	23.11	2.72	19.63	42.74	22.35	56.00	46.00	-13.26	-23.65	Pass
6	10.4420	26.81	16.67	20.05	46.86	36.72	60.00	50.00	-13.14	-13.28	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 $\geq 50$ hopping channels
	0.25 for $25 \leq$ hopping channels $< 50$
	1 for digital modulation
2400-2483.5	1 for $\geq 75$ 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



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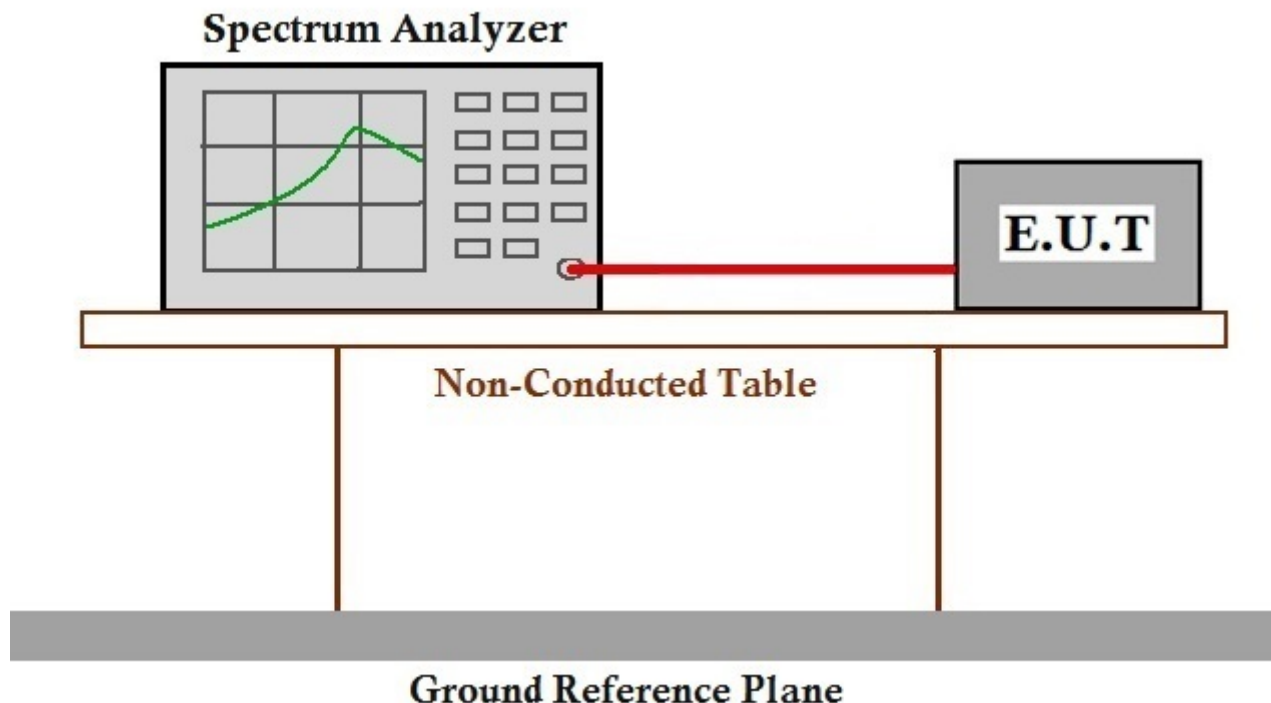
### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode e:Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.2.2 Test Setup Diagram



### 7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668



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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

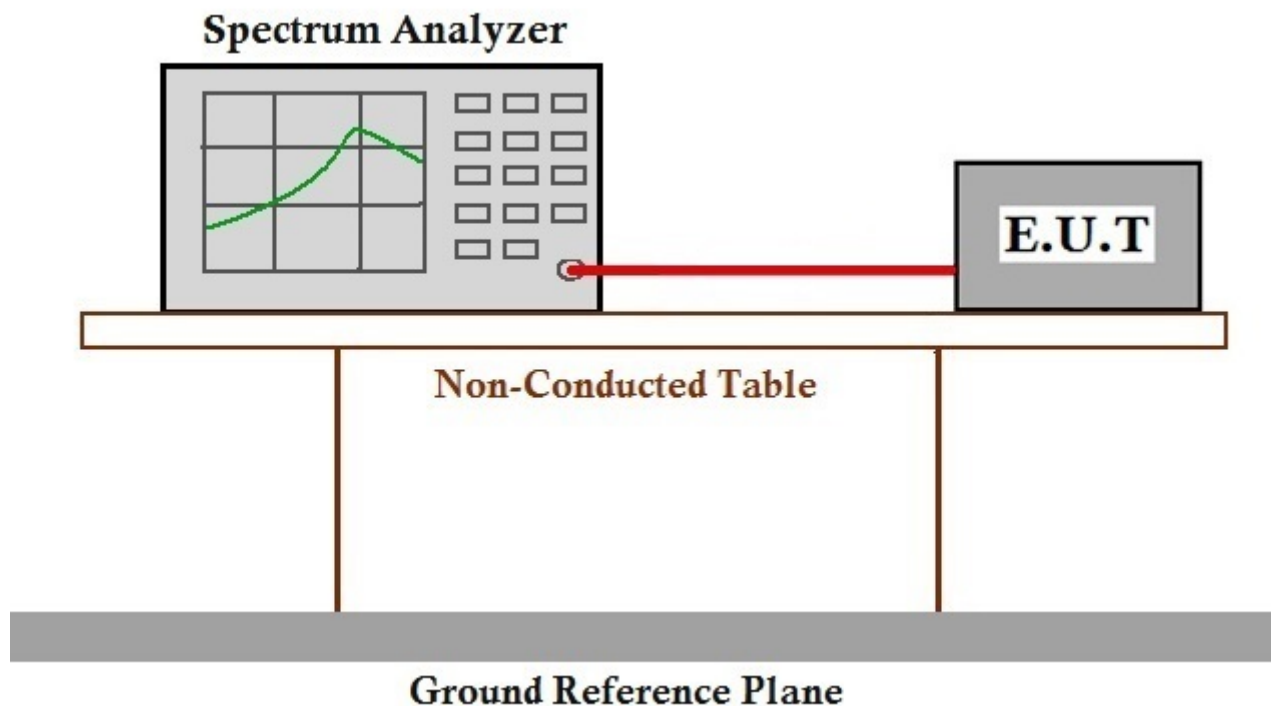
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode e: Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

#### 7.3.2 Test Setup Diagram



#### 7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668



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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:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W

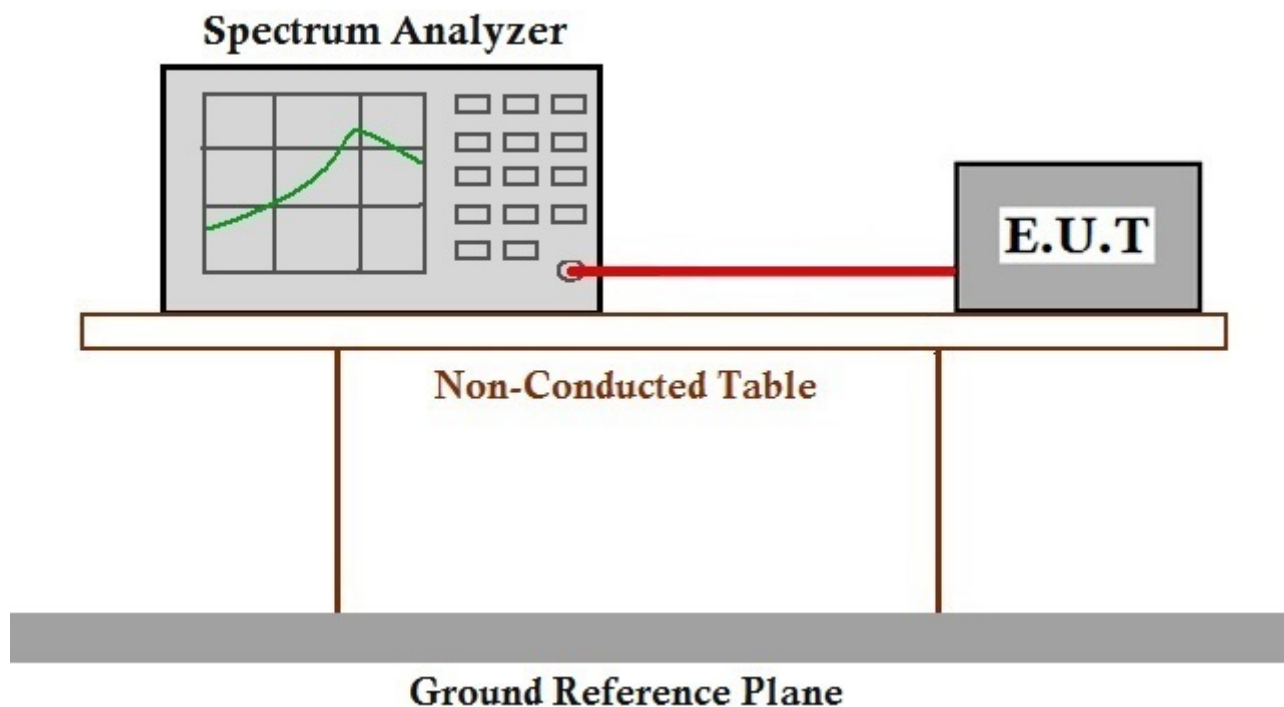
### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode d:Module MT7668 TX\_Hop mode\_Keep the EUT in frequency hopping mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.4.2 Test Setup Diagram



### 7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668



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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

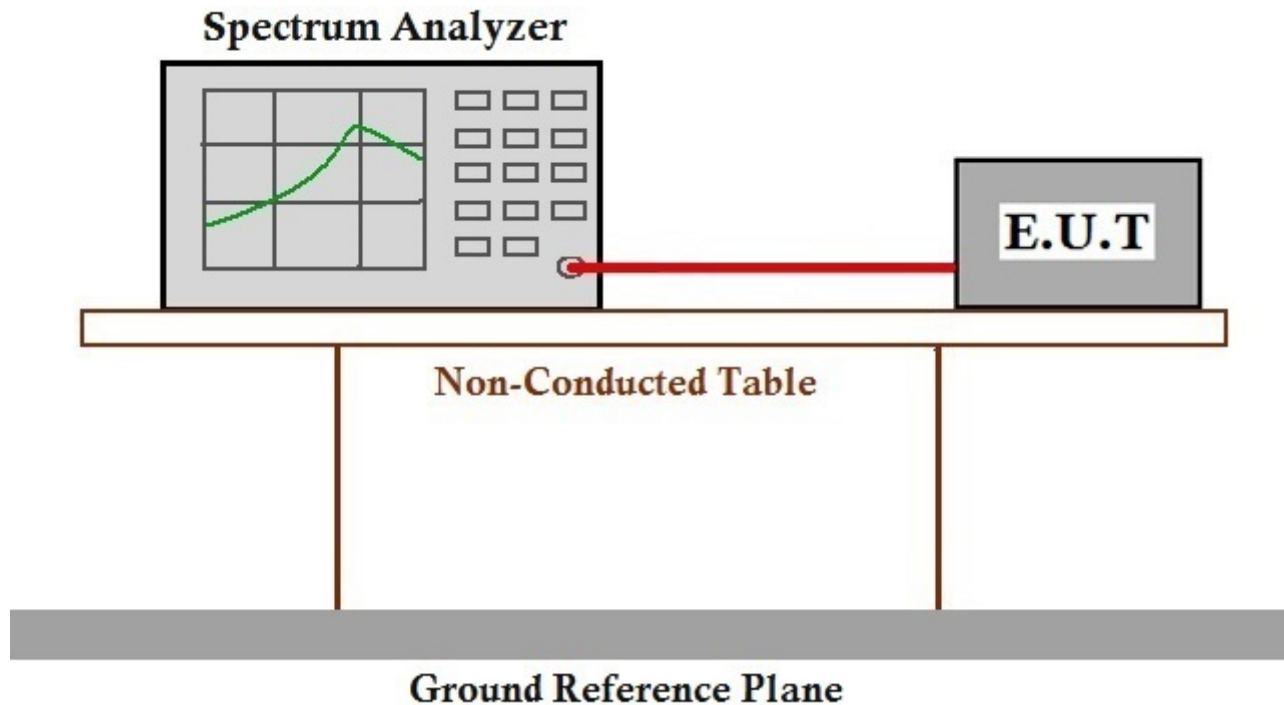
### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode d:Module MT7668 TX\_Hop mode\_Keep the EUT in frequency hopping mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.5.2 Test Setup Diagram



### 7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668



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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

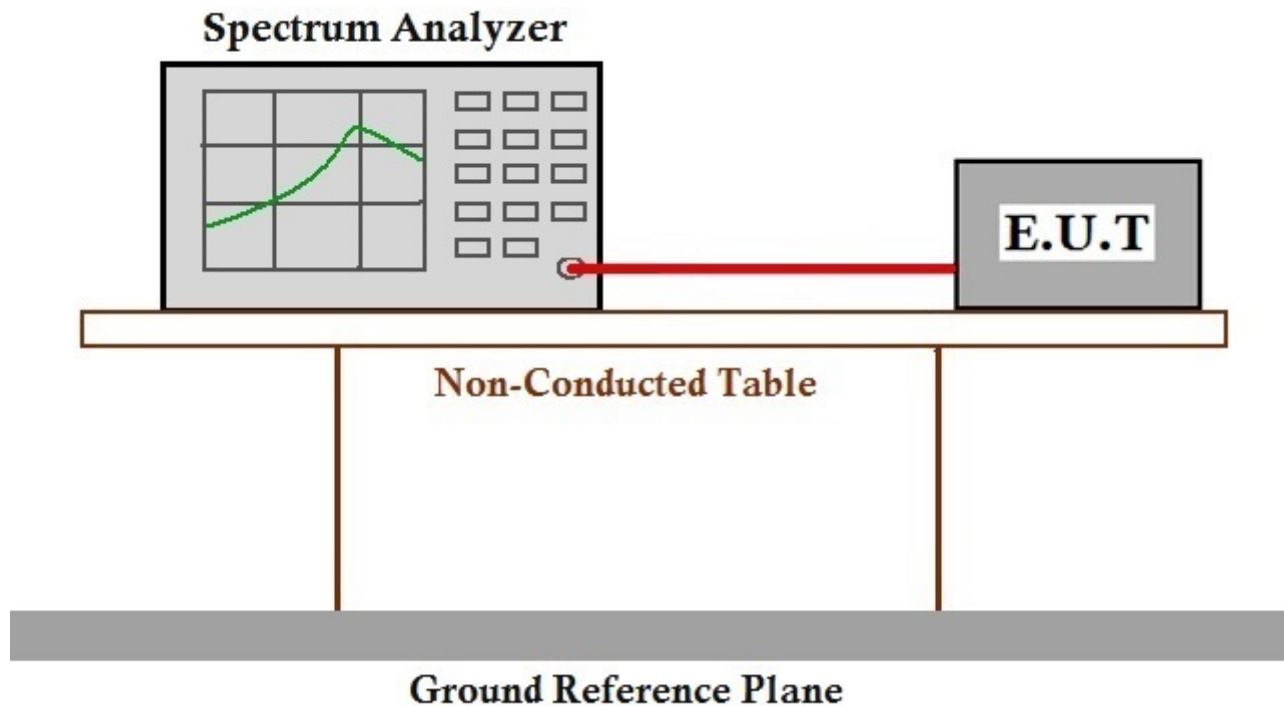
### 7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode d:Module MT7668 TX\_Hop mode\_Keep the EUT in frequency hopping mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.6.2 Test Setup Diagram



### 7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668



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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: 50 % RH Atmospheric Pressure: 1010 mbar

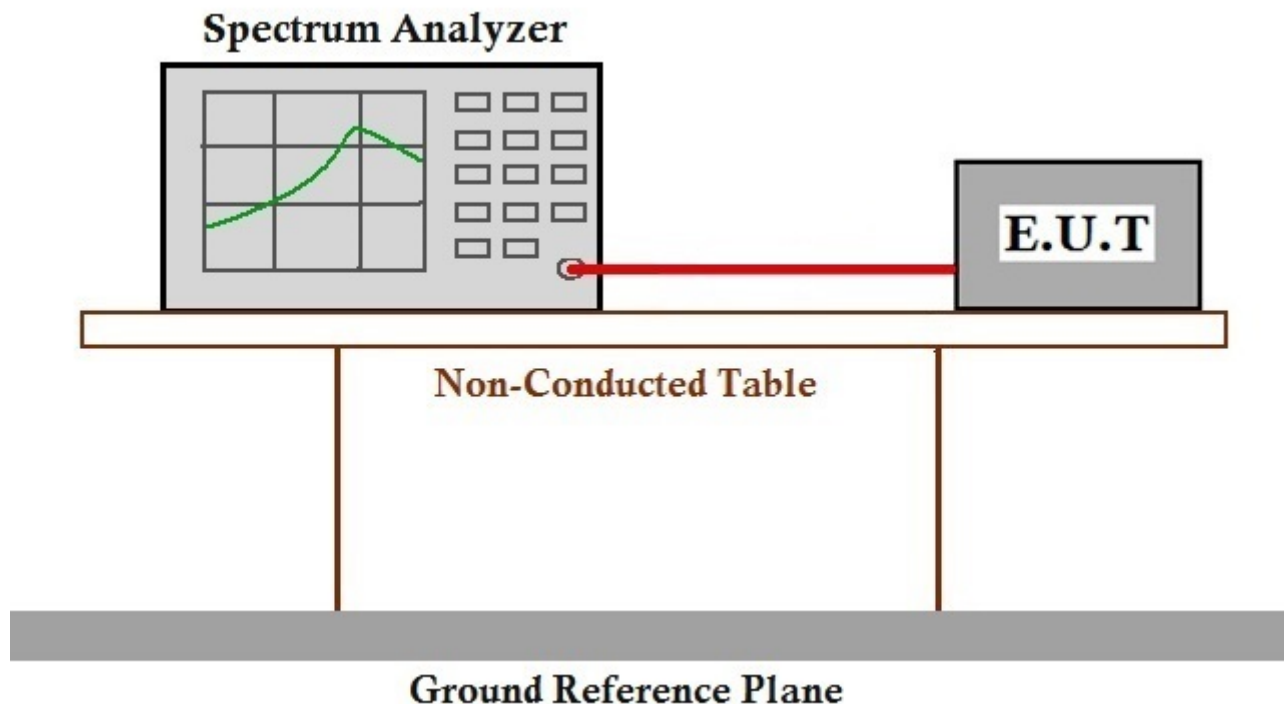
Pretest these modes to find the worst case: d:Module MT7668 TX\_Hop mode\_Keep the EUT in frequency hopping mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

e:Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

The worst case for final test: d:Module MT7668 TX\_Hop mode\_Keep the EUT in frequency hopping mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

e:Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.7.2 Test Setup Diagram



### 7.7.3 Measurement Procedure and Data

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668



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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))



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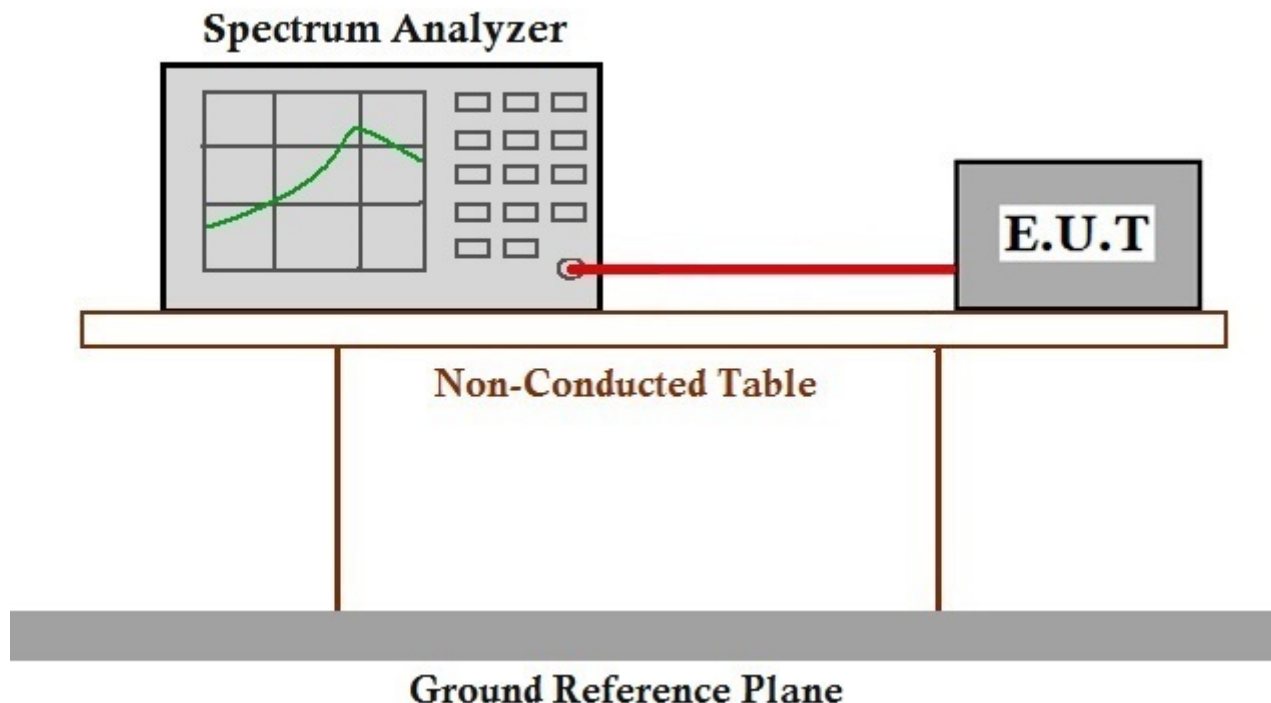
### 7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode e:Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.8.2 Test Setup Diagram



### 7.8.3 Measurement Procedure and Data

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668



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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.



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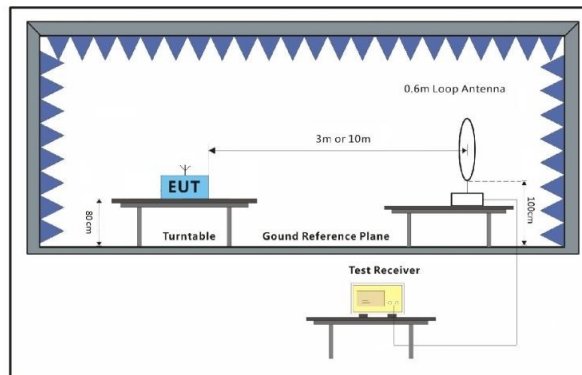
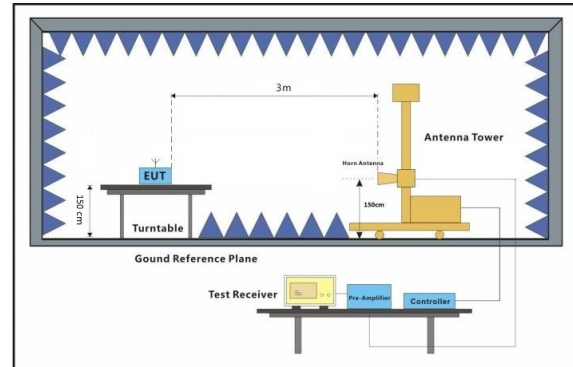
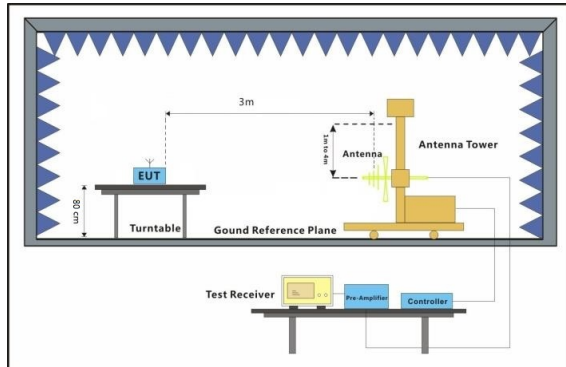
### 7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode e:Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.9.2 Test Setup Diagram



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### 7.9.3 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.



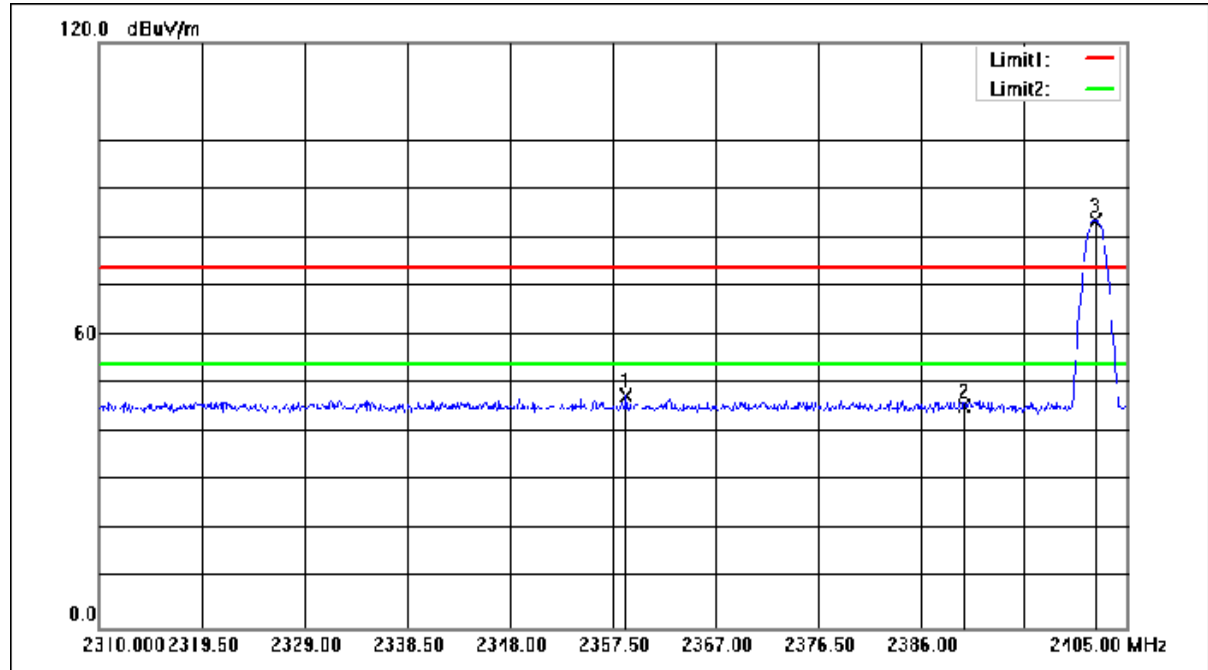
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2358.735	61.64	-14.10	47.54	74.00	-26.46	peak
2	2390.000	59.49	-14.01	45.48	74.00	-28.52	peak
3	2402.150	97.59	-13.97	83.62	74.00	9.62	peak



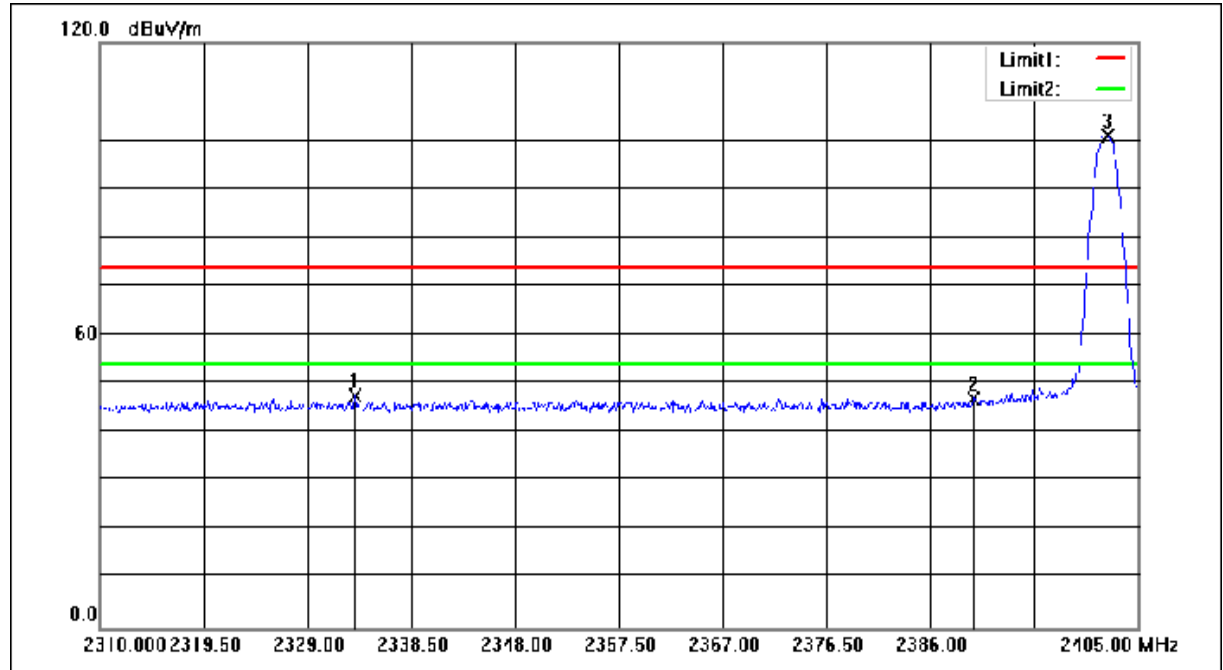
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2333.370	61.79	-14.18	47.61	74.00	-26.39	peak
2	2390.000	60.86	-14.01	46.85	74.00	-27.15	peak
3	2402.245	115.00	-13.97	101.03	74.00	27.03	peak



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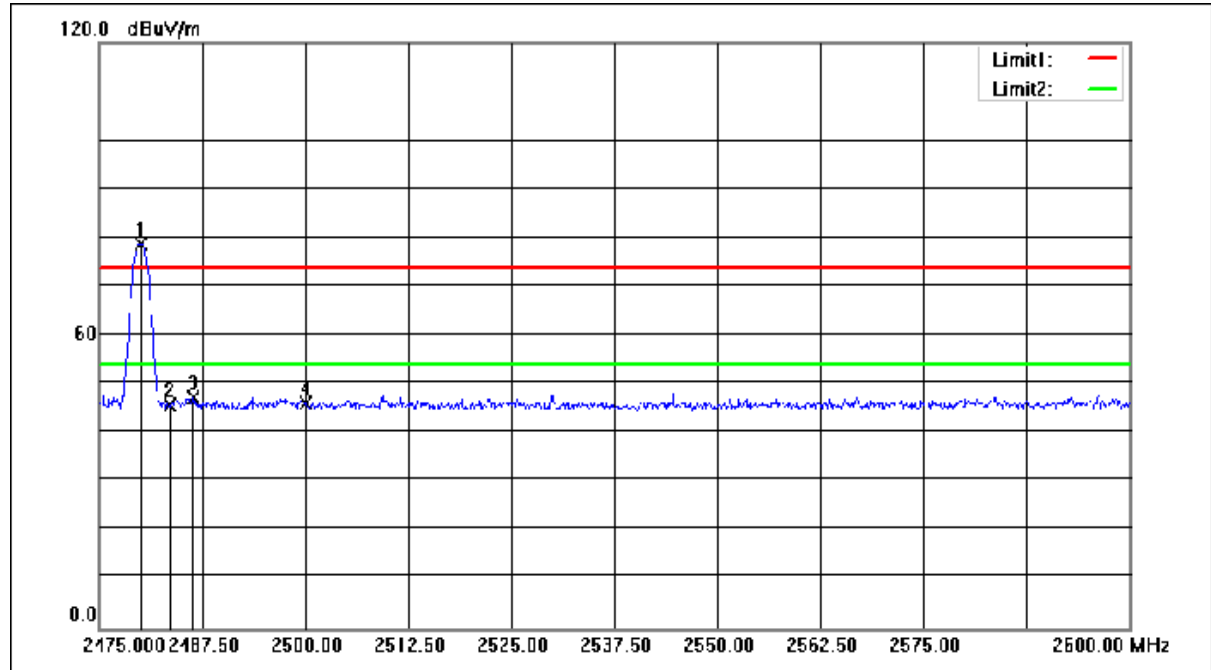
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Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.125	92.44	-13.71	78.73	74.00	4.73	peak
2	2483.500	59.37	-13.71	45.66	74.00	-28.34	peak
3	2486.375	61.06	-13.70	47.36	74.00	-26.64	peak
4	2500.000	59.68	-13.64	46.04	74.00	-27.96	peak



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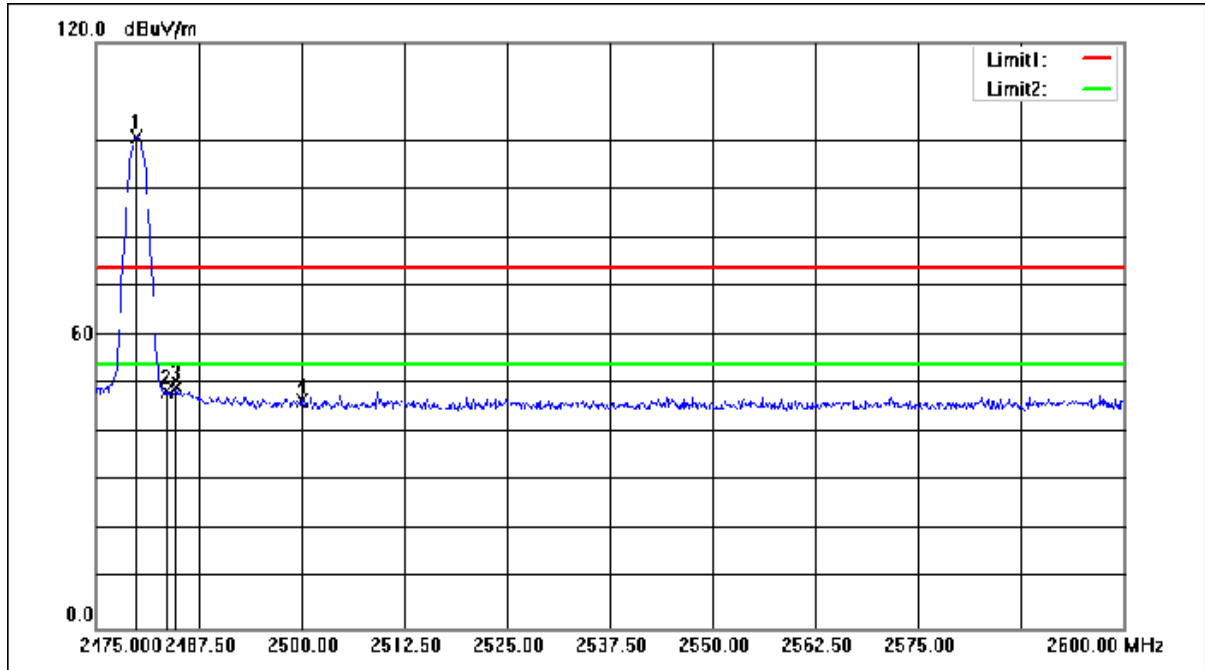
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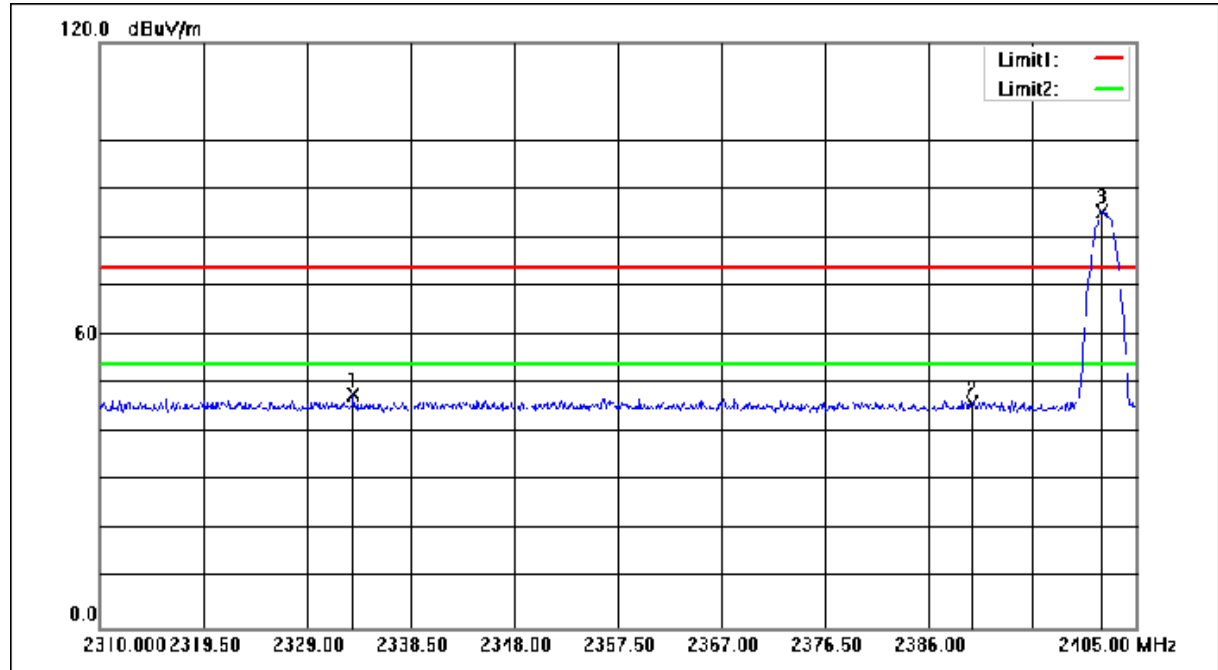
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2479.875	114.23	-13.71	100.52	74.00	26.52	peak
2	2483.500	62.04	-13.71	48.33	74.00	-25.67	peak
3	2484.750	62.93	-13.70	49.23	74.00	-24.77	peak
4	2500.000	60.44	-13.64	46.80	74.00	-27.20	peak



Mode:e; Polarization:Horizontal; Modulation: $\pi/4$  DQPSK; ; Channel:Low

No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2333.275	62.13	-14.18	47.95	74.00	-26.05	peak
2	2390.000	60.02	-14.01	46.01	74.00	-27.99	peak
3	2401.865	99.37	-13.98	85.39	74.00	11.39	peak

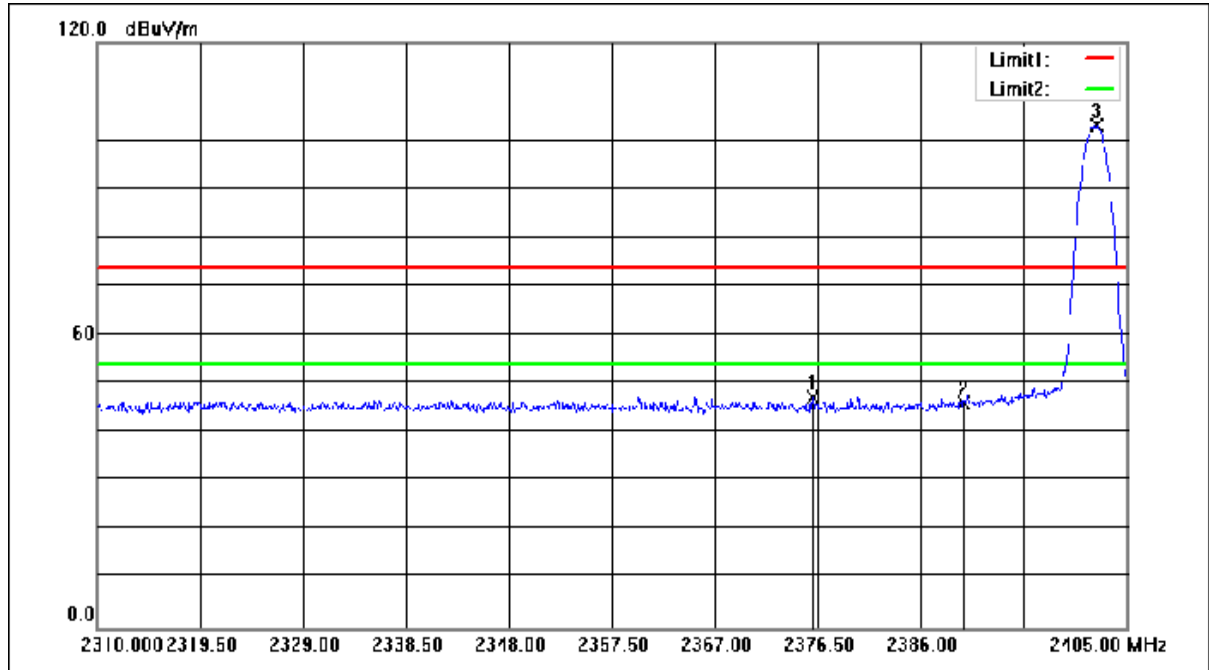


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Mode:e; Polarization:Vertical; Modulation: $\pi/4$  DQPSK; ; Channel:Low

No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2376.025	61.29	-14.05	47.24	74.00	-26.76	peak
2	2390.000	60.08	-14.01	46.07	74.00	-27.93	peak
3	2402.245	116.98	-13.97	103.01	74.00	29.01	peak



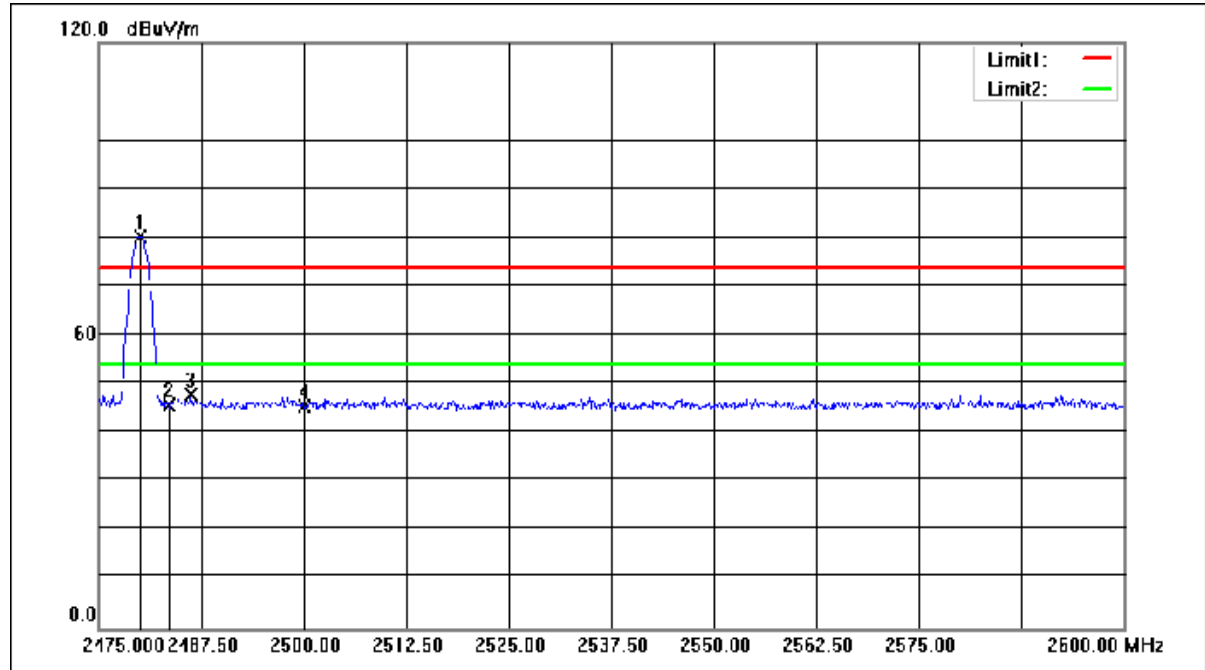
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Mode:e; Polarization:Horizontal; Modulation: $\pi/4$  DQPSK; ; Channel:High

No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.125	94.10	-13.71	80.39	74.00	6.39	peak
2	2483.500	59.59	-13.71	45.88	74.00	-28.12	peak
3	2486.250	61.49	-13.70	47.79	74.00	-26.21	peak
4	2500.000	59.05	-13.64	45.41	74.00	-28.59	peak

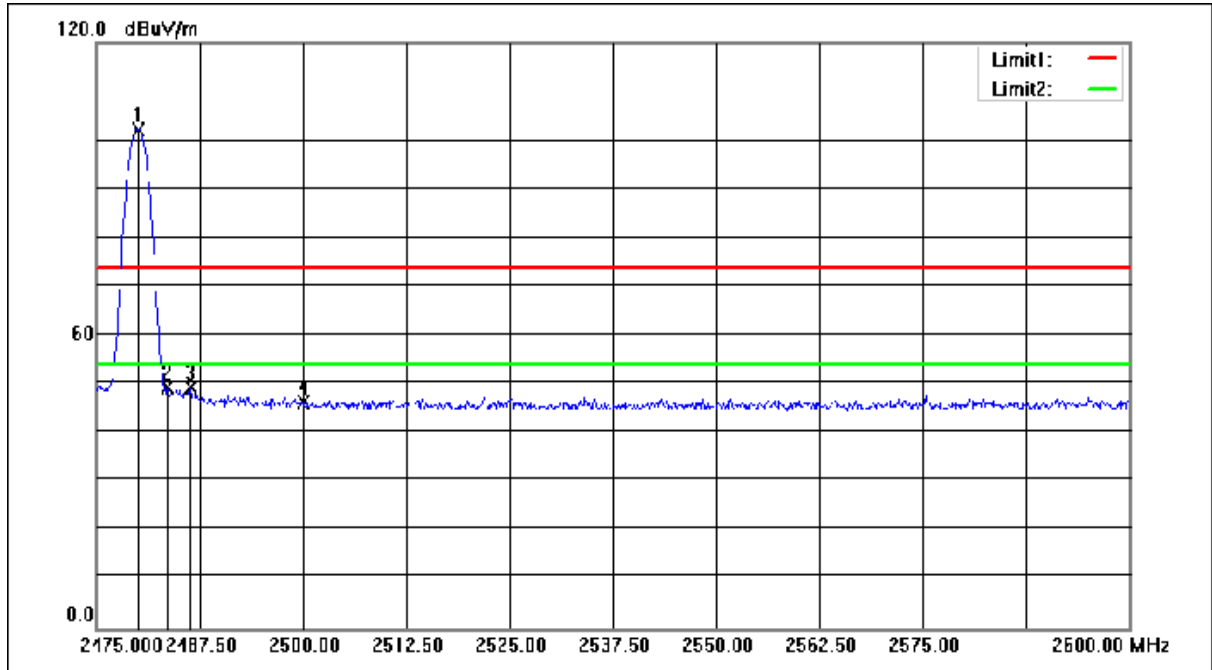


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Mode:e; Polarization:Vertical; Modulation: $\pi/4$  DQPSK; ; Channel:High

No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.125	115.85	-13.71	102.14	74.00	28.14	peak
2	2483.500	62.93	-13.71	49.22	74.00	-24.78	peak
3	2486.375	62.93	-13.70	49.23	74.00	-24.77	peak
4	2500.000	60.05	-13.64	46.41	74.00	-27.59	peak



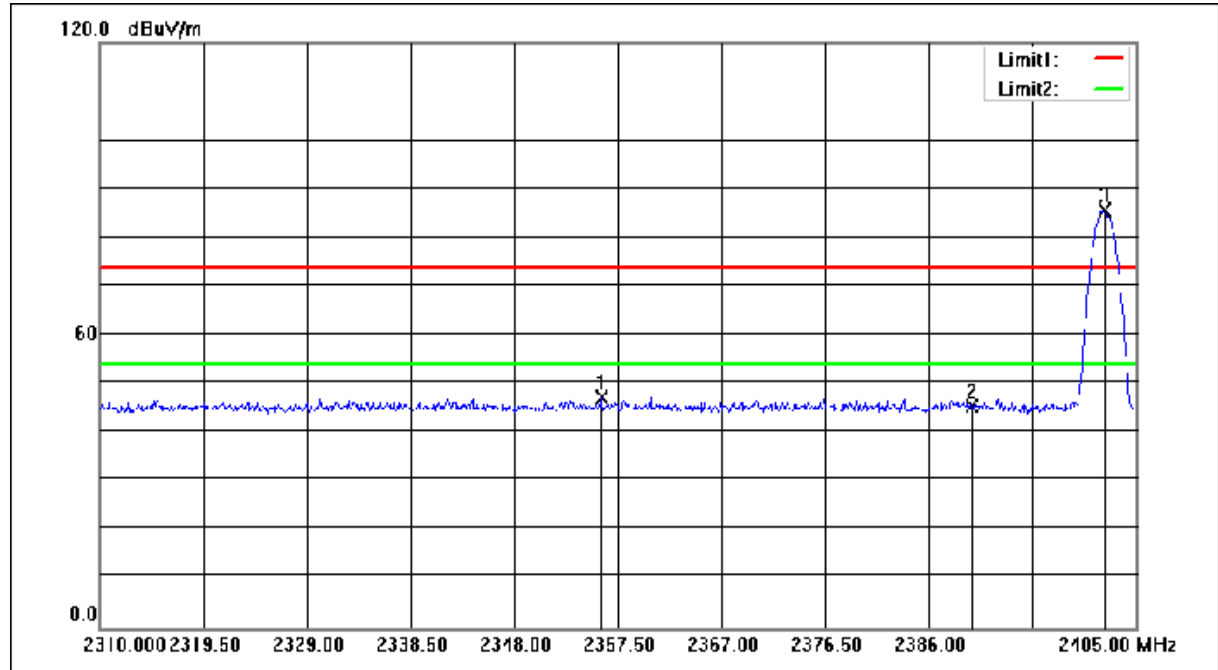
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Mode:e; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2355.980	61.30	-14.12	47.18	74.00	-26.82	peak
2	2390.000	59.39	-14.01	45.38	74.00	-28.62	peak
3	2402.150	99.73	-13.97	85.76	74.00	11.76	peak



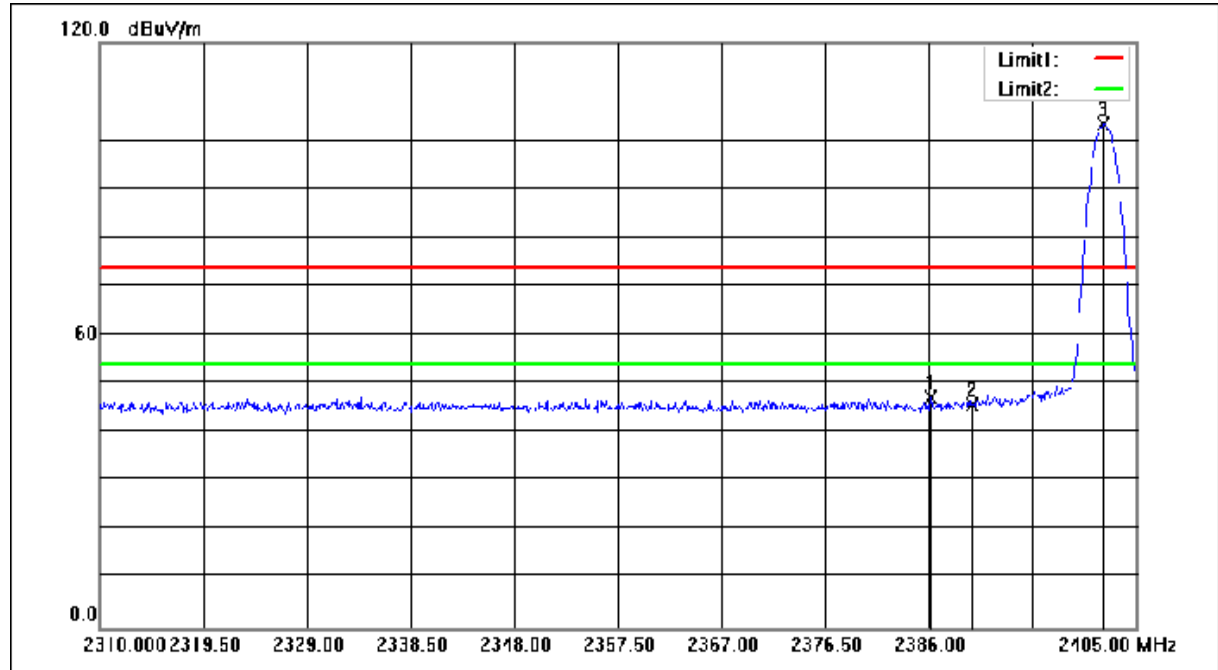
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Mode:e; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2386.190	61.17	-14.02	47.15	74.00	-26.85	peak
2	2390.000	59.69	-14.01	45.68	74.00	-28.32	peak
3	2402.055	117.18	-13.97	103.21	74.00	29.21	peak



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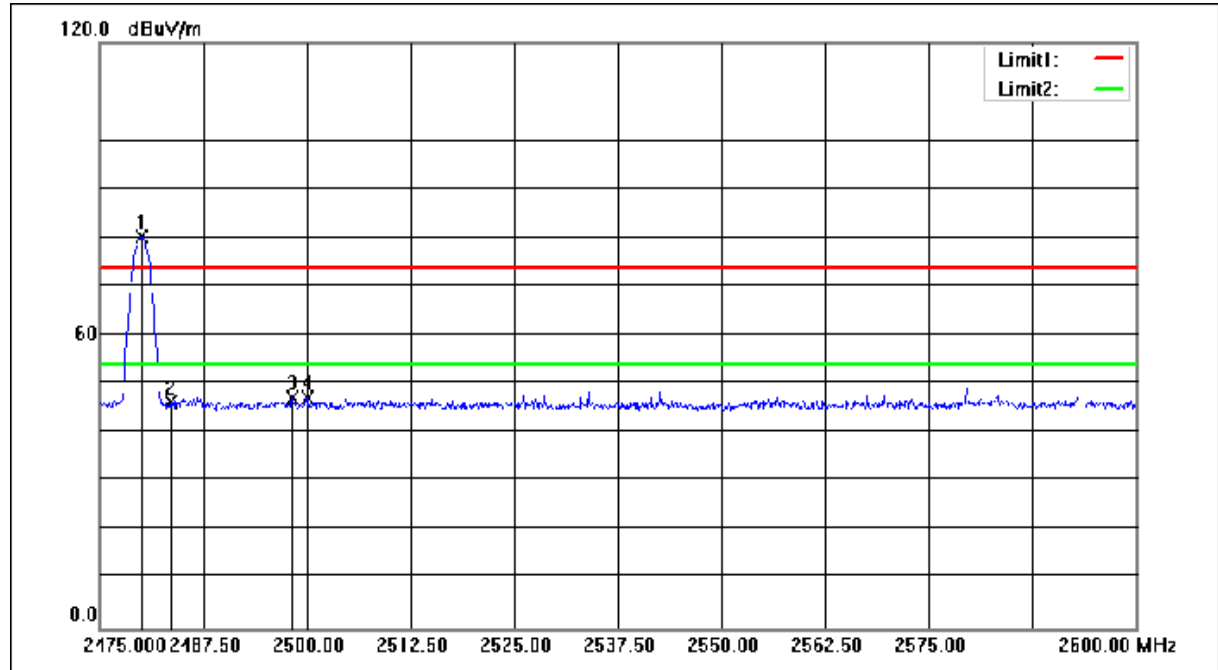
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Mode:e; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	94.05	-13.71	80.34	74.00	6.34	peak
2	2483.500	60.13	-13.71	46.42	74.00	-27.58	peak
3	2498.250	61.03	-13.66	47.37	74.00	-26.63	peak
4	2500.000	60.91	-13.64	47.27	74.00	-26.73	peak



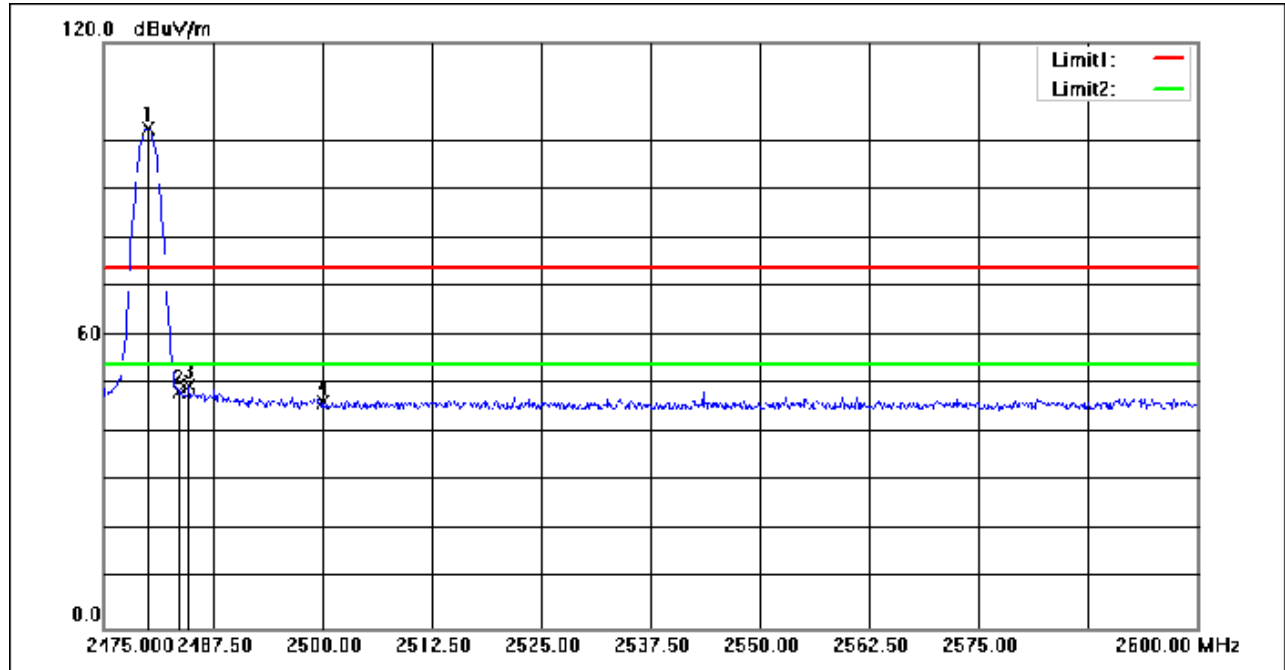
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Mode:e; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	116.06	-13.71	102.35	74.00	28.35	peak
2	2483.500	62.05	-13.71	48.34	74.00	-25.66	peak
3	2484.750	63.21	-13.70	49.51	74.00	-24.49	peak
4	2500.000	60.12	-13.64	46.48	74.00	-27.52	peak

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## 7.10 Radiated Spurious Emissions

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

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

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.



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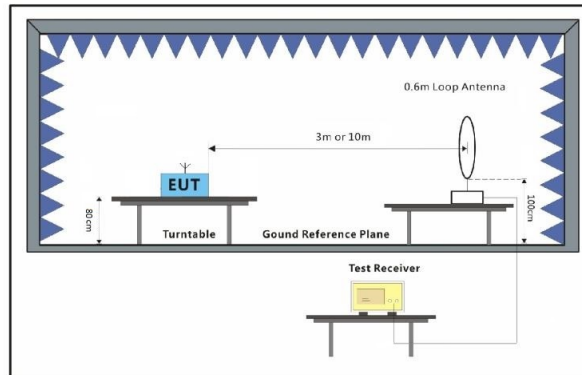
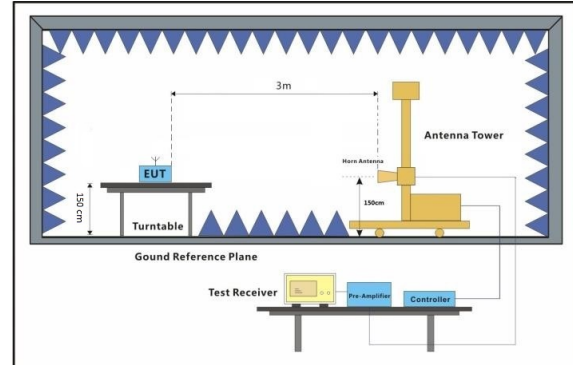
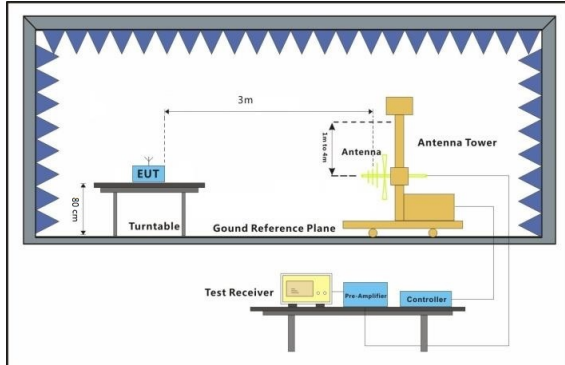
### 7.10.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode e:Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

### 7.10.2 Test Setup Diagram



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### 7.10.3 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) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and 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.

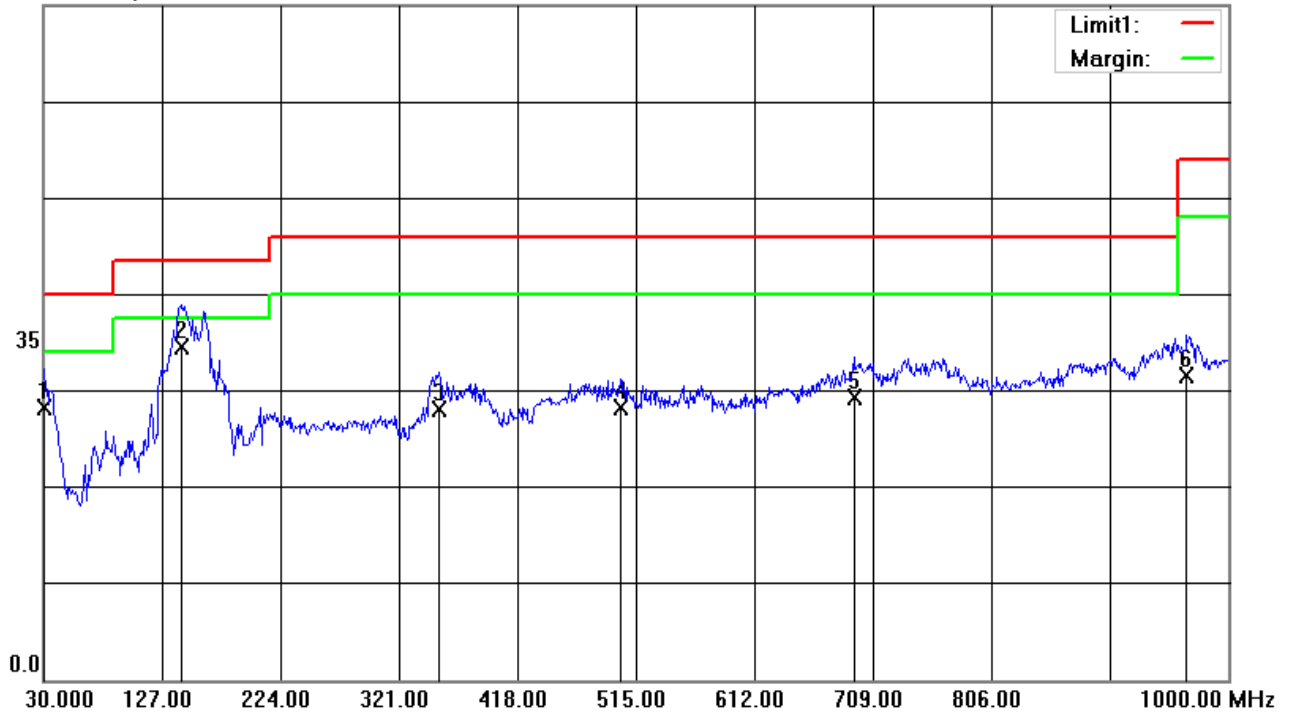
4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower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



30MHz-1GHz

Horizontal

70.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.9700	2.94	25.38	28.32	40.00	-11.68	QP
2	143.4900	14.69	19.93	34.62	43.50	-8.88	QP
3	353.9800	5.56	22.48	28.04	46.00	-17.96	QP
4	502.3900	3.06	25.27	28.33	46.00	-17.67	QP
5	693.4800	1.90	27.45	29.35	46.00	-16.65	QP
6	966.0500	2.33	29.27	31.60	54.00	-22.40	QP



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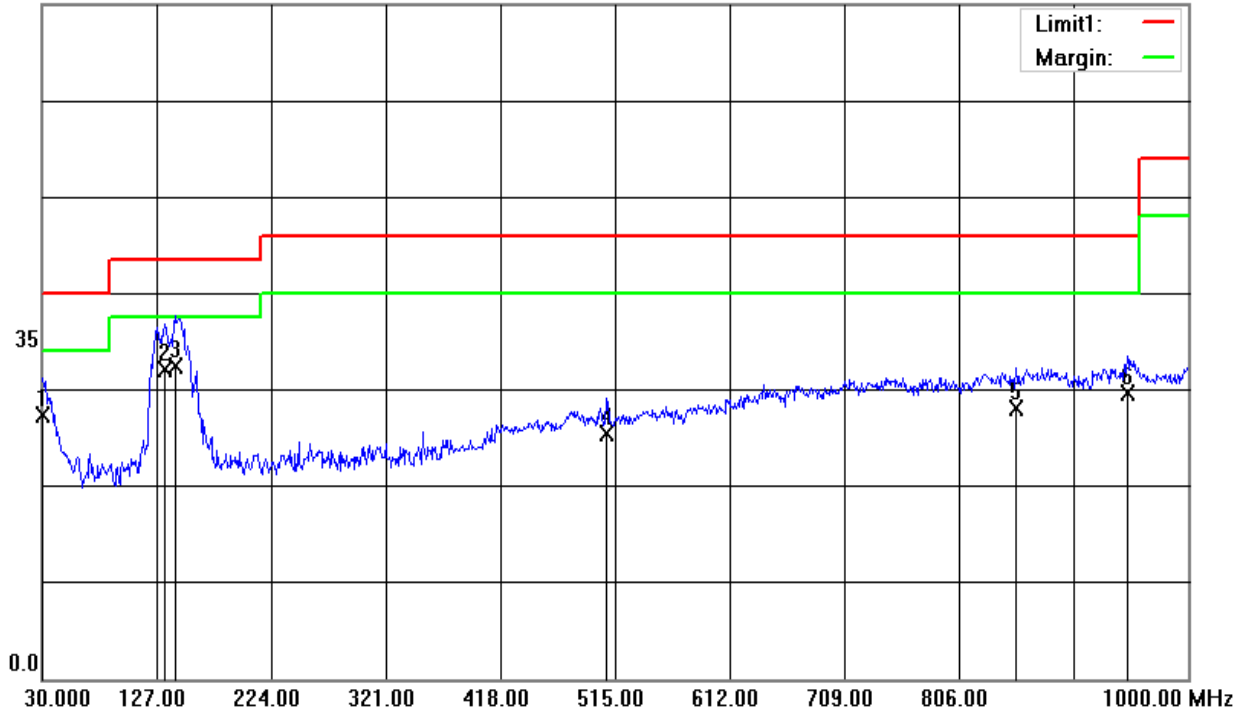
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Vertical

70.0 dBuV/m



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.0000	1.40	25.93	27.33	40.00	-12.67	QP
2	133.7900	12.45	19.61	32.06	43.50	-11.44	QP
3	143.4900	12.61	19.93	32.54	43.50	-10.96	QP
4	507.2400	0.09	25.33	25.42	46.00	-20.58	QP
5	854.5000	0.00	28.13	28.13	46.00	-17.87	QP
6	948.5900	0.40	29.28	29.68	46.00	-16.32	QP

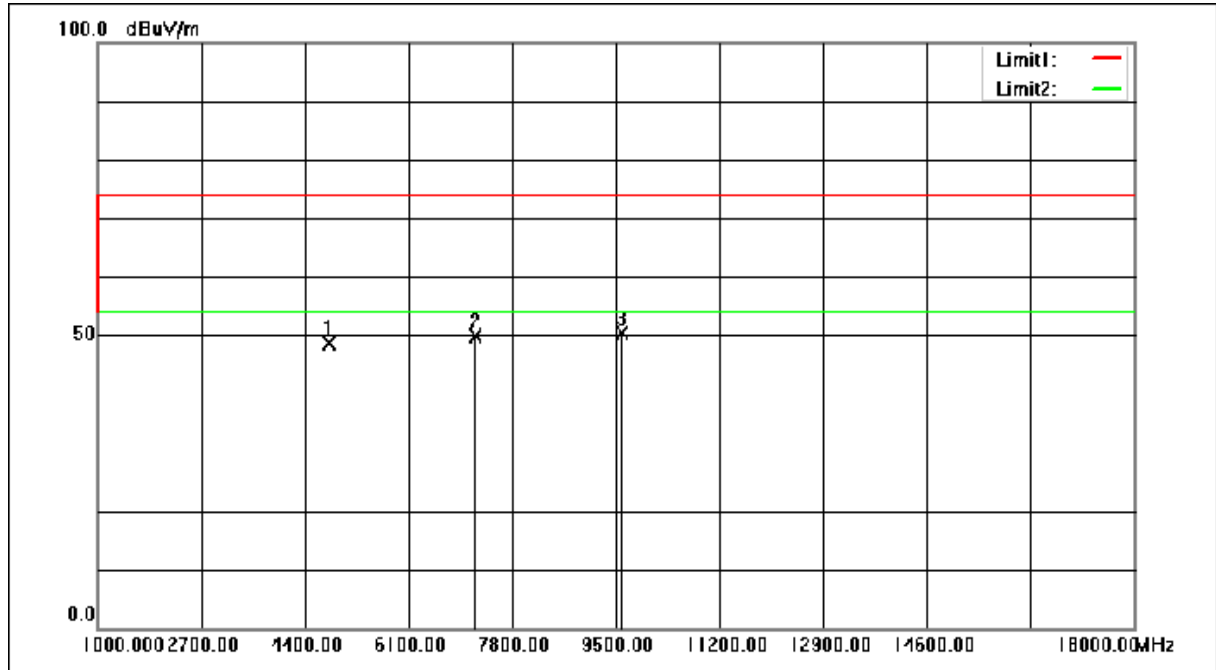
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Above 1GHz

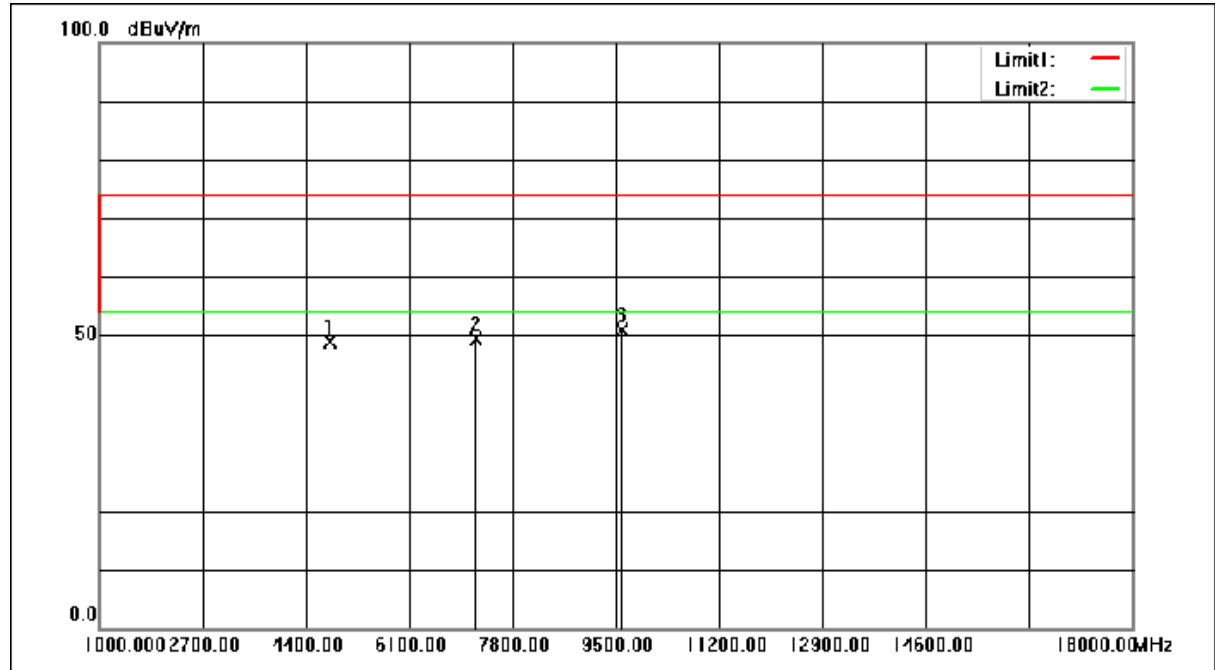
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No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.50	-8.86	48.64	74.00	-25.36	peak
2	7206.000	55.67	-5.89	49.78	74.00	-24.22	peak
3	9608.000	51.60	-1.26	50.34	74.00	-23.66	peak



Mode:e; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.64	-8.86	48.78	74.00	-25.22	peak
2	7206.000	55.30	-5.89	49.41	74.00	-24.59	peak
3	9608.000	52.19	-1.26	50.93	74.00	-23.07	peak



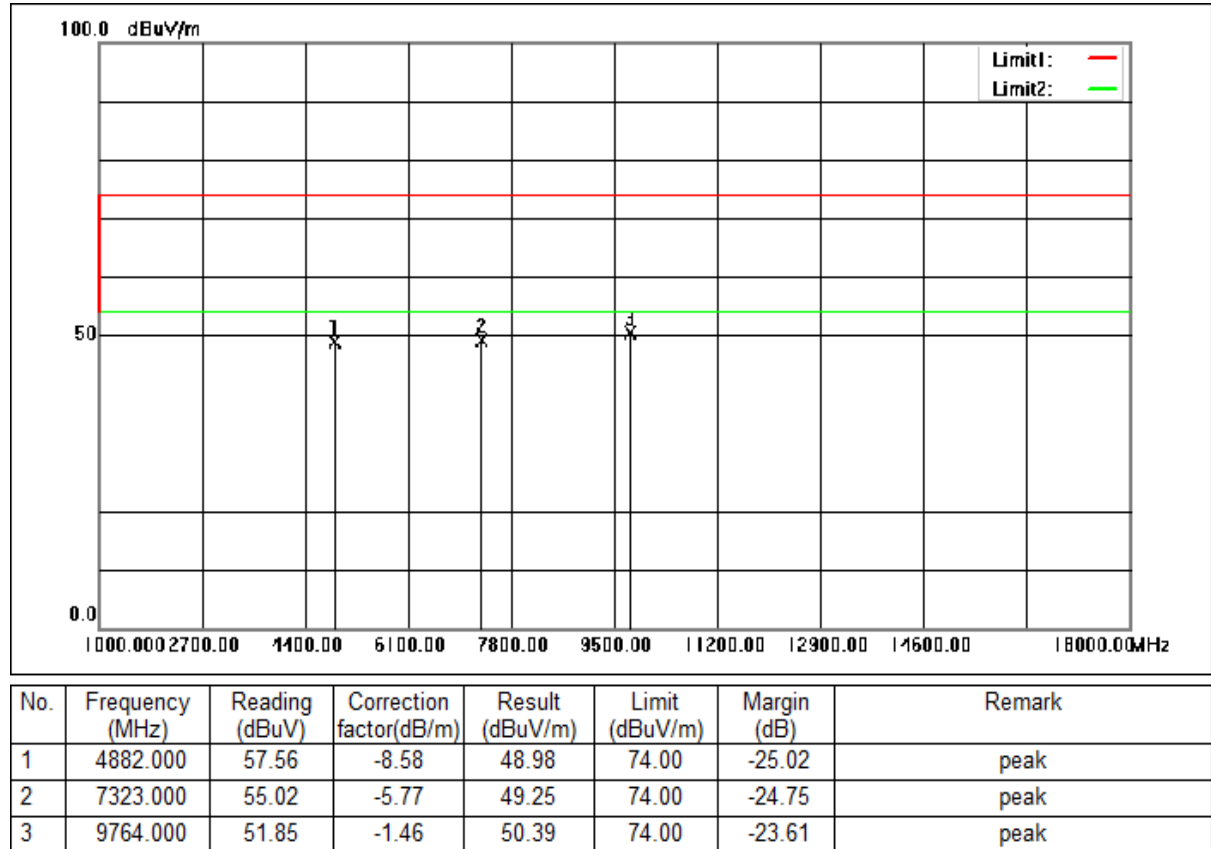
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Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



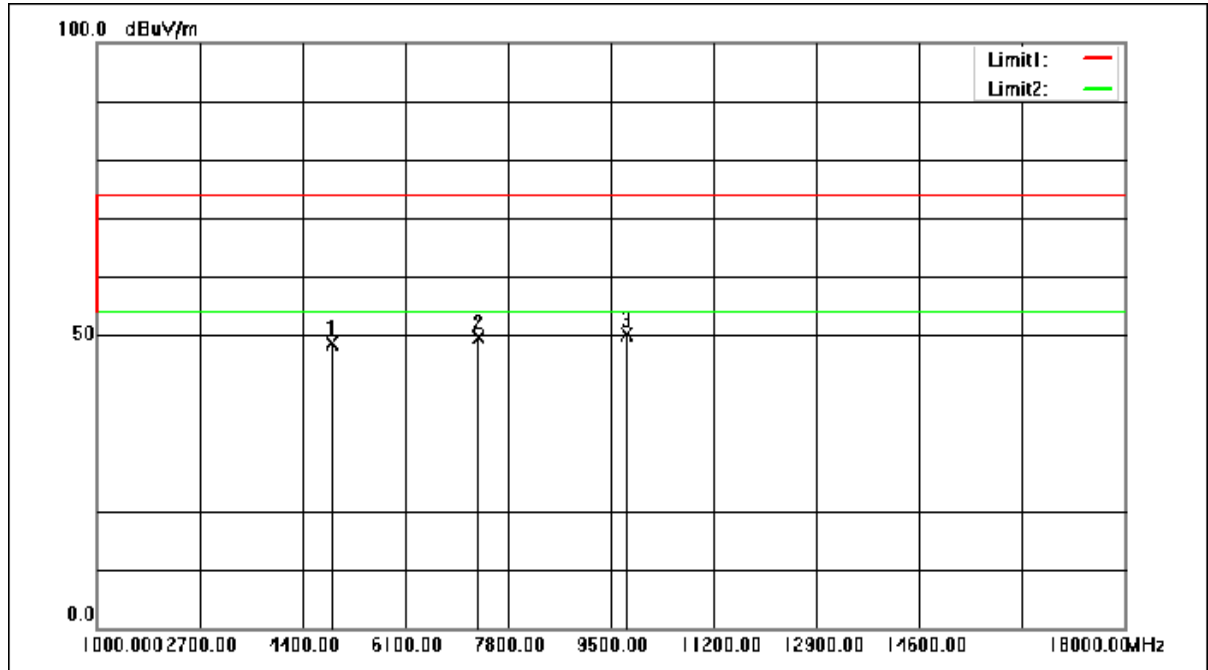
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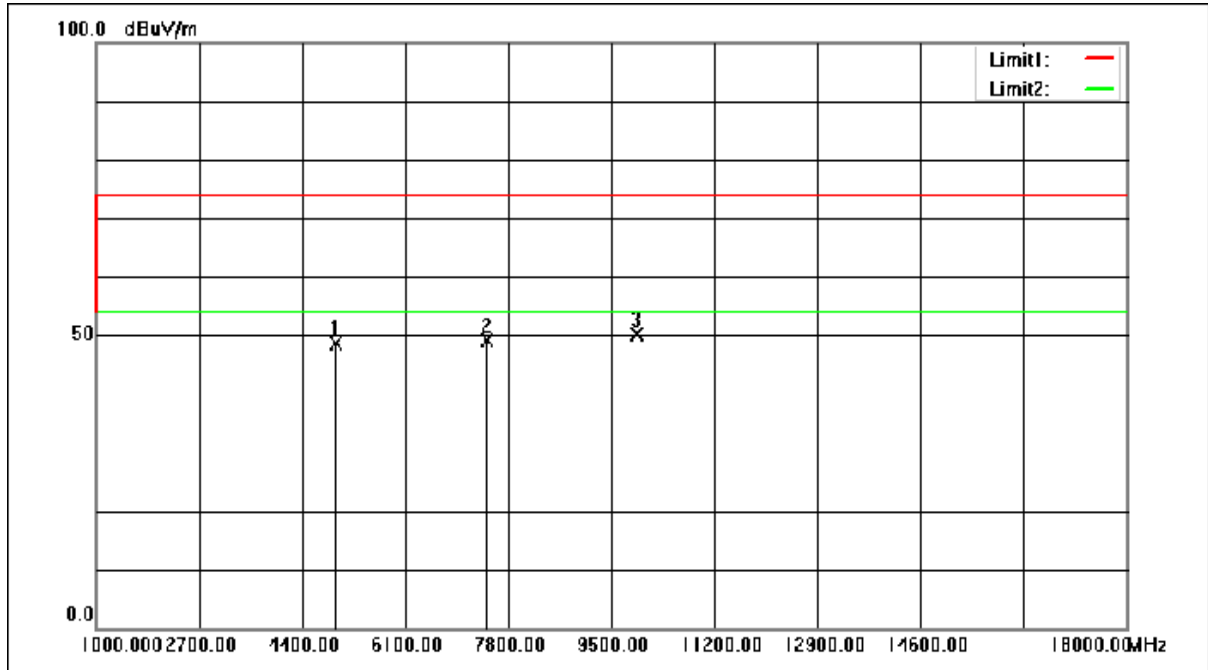
Mode:e; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.27	-8.58	48.69	74.00	-25.31	peak
2	7323.000	55.35	-5.77	49.58	74.00	-24.42	peak
3	9764.000	51.58	-1.46	50.12	74.00	-23.88	peak



Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	56.92	-8.32	48.60	74.00	-25.40	peak
2	7440.000	54.75	-5.63	49.12	74.00	-24.88	peak
3	9920.000	50.98	-0.94	50.04	74.00	-23.96	peak

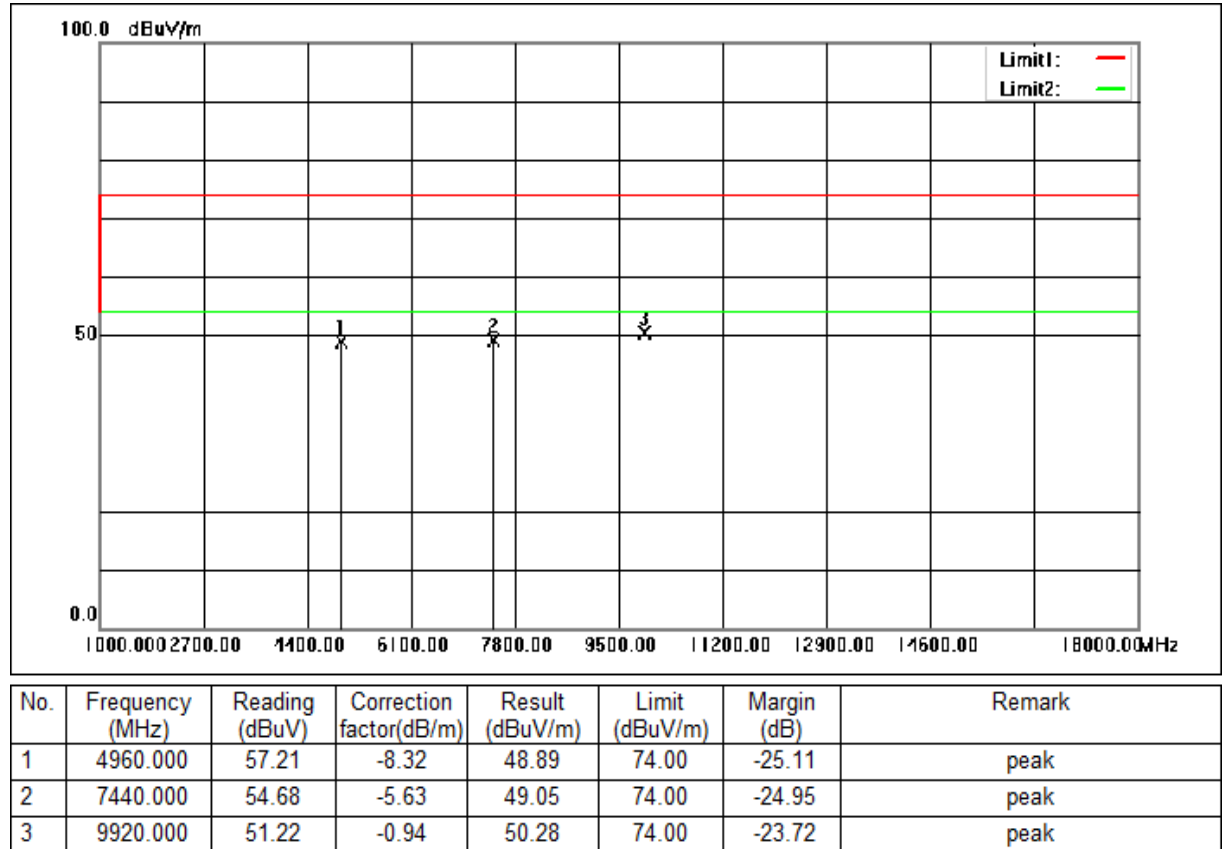


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Mode:e; Polarization:Vertical; Modulation:GFSK; ; Channel:High

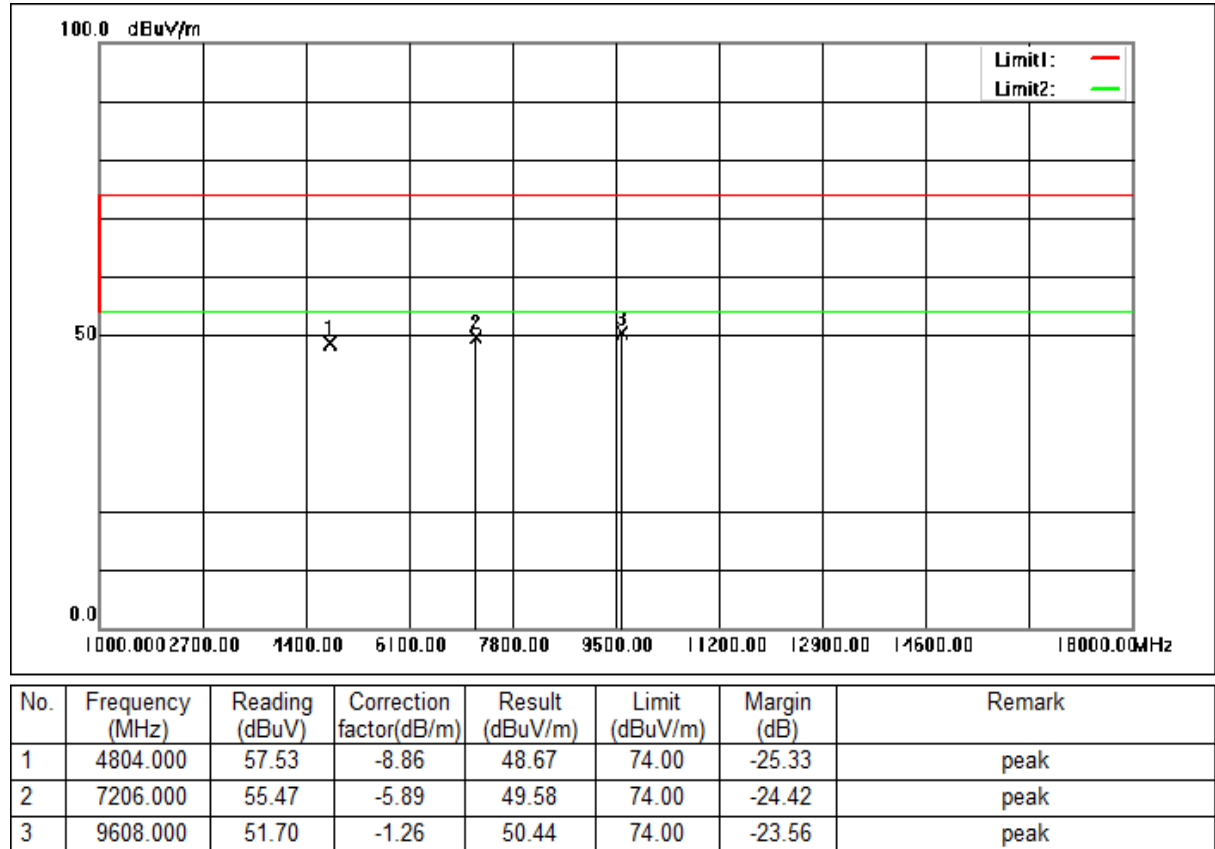


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Mode:e; Polarization:Horizontal; Modulation: $\pi/4$  DQPSK; ; Channel:Low

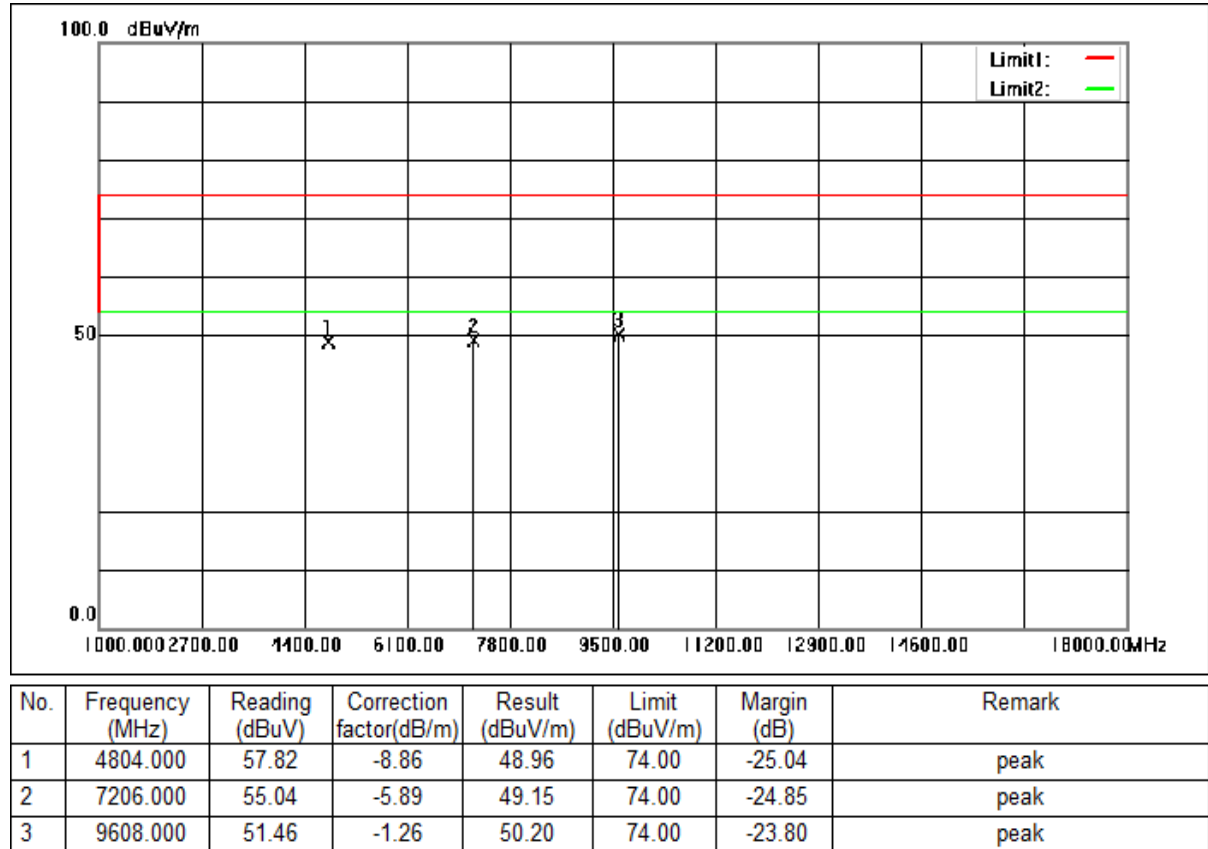
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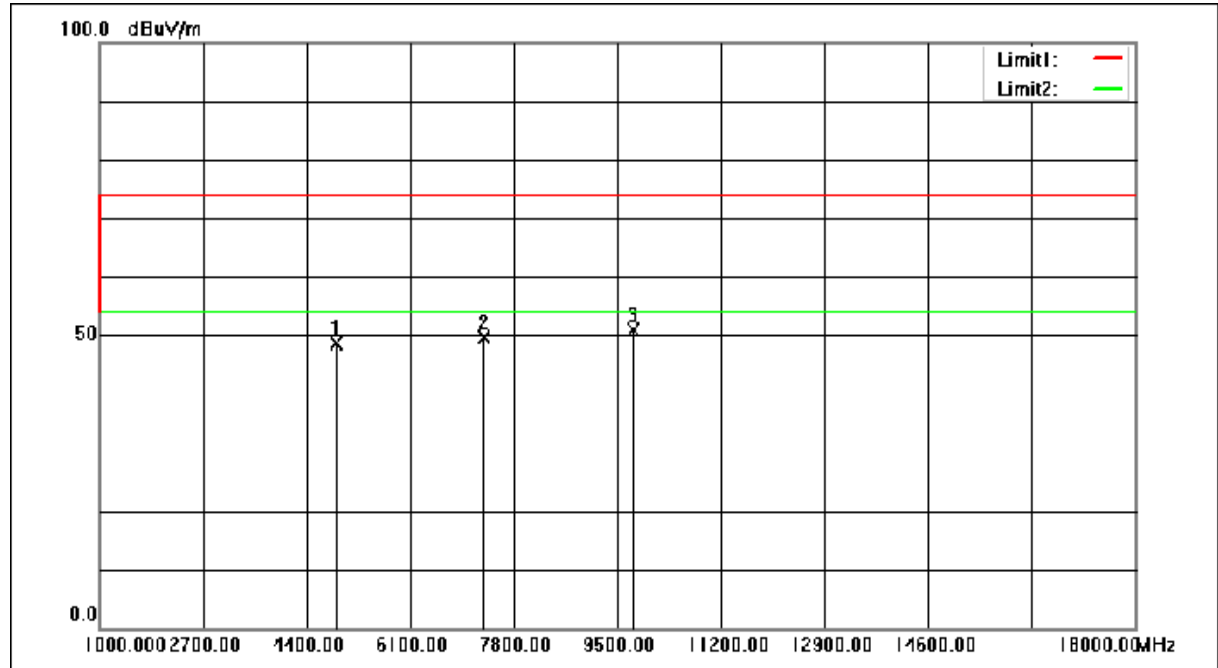
Mode:e; Polarization:Vertical; Modulation: $\pi/4$  DQPSK; ; Channel:Low

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Mode:e; Polarization:Horizontal; Modulation: $\pi/4$  DQPSK; ; Channel:middle

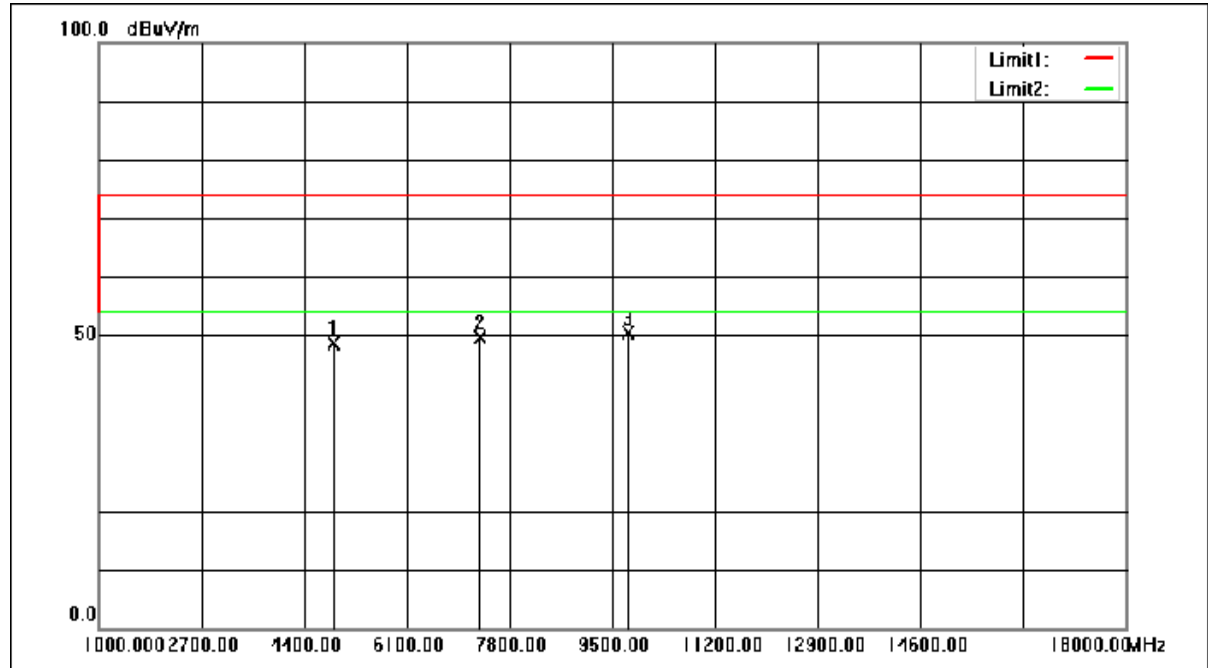
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.12	-8.58	48.54	74.00	-25.46	peak
2	7323.000	55.33	-5.77	49.56	74.00	-24.44	peak
3	9764.000	52.35	-1.46	50.89	74.00	-23.11	peak



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Mode:e; Polarization:Vertical; Modulation: $\pi/4$  DQPSK; ; Channel:middle

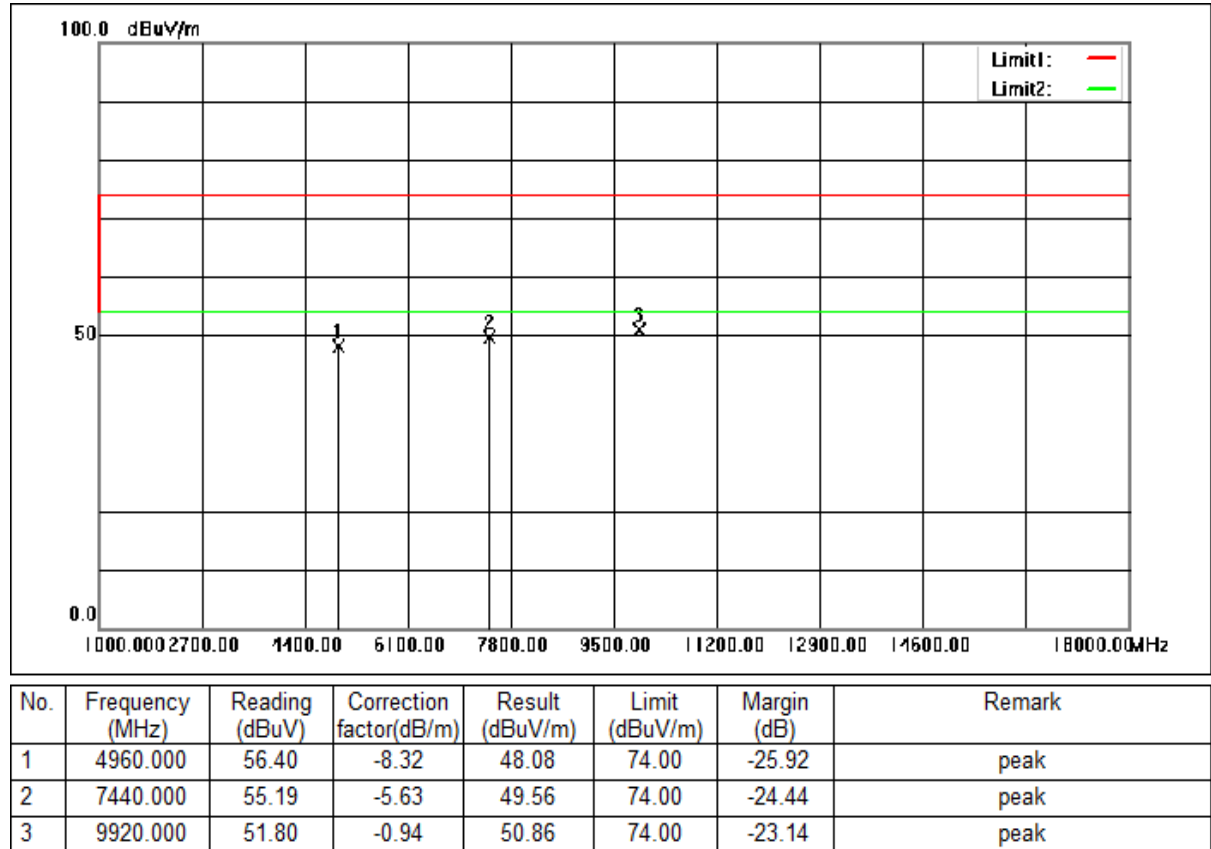
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.13	-8.58	48.55	74.00	-25.45	peak
2	7323.000	55.45	-5.77	49.68	74.00	-24.32	peak
3	9764.000	51.82	-1.46	50.36	74.00	-23.64	peak



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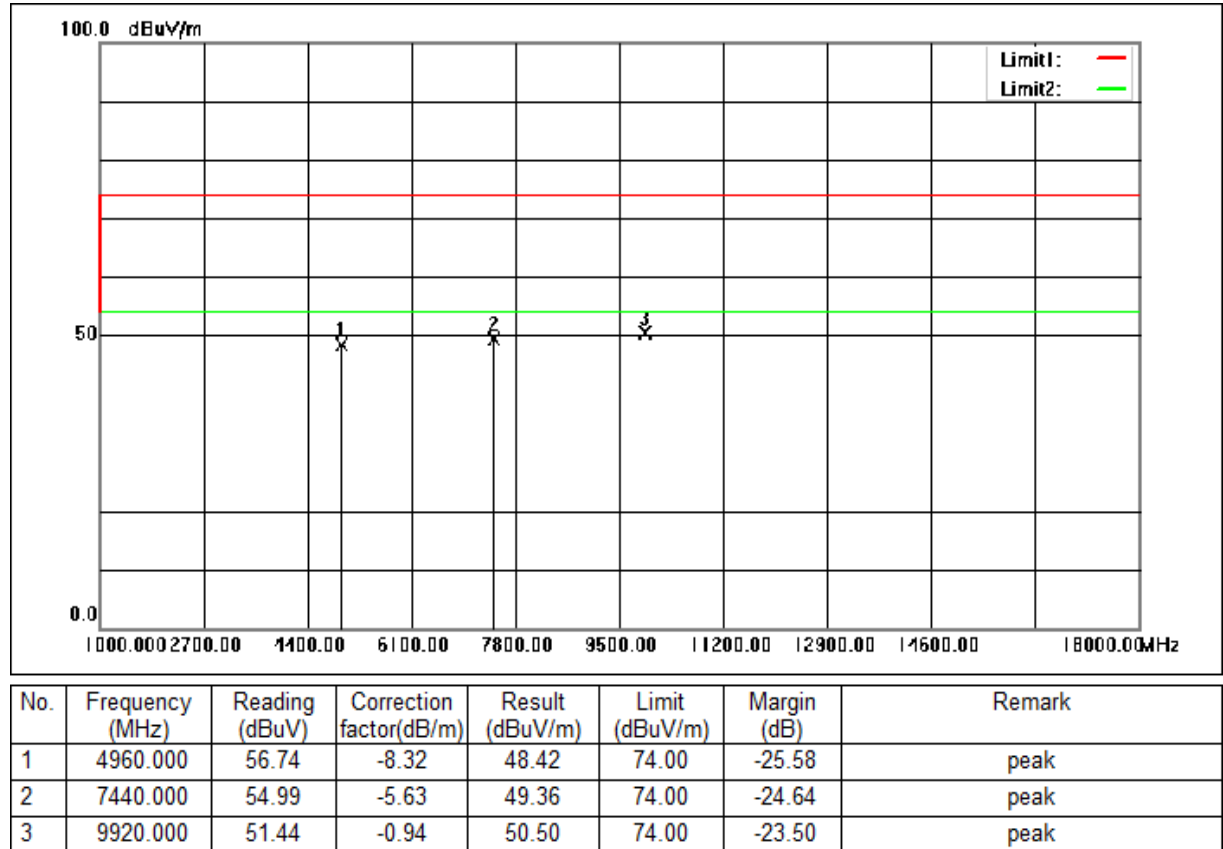
Mode:e; Polarization:Horizontal; Modulation: $\pi/4$  DQPSK; ; Channel:High

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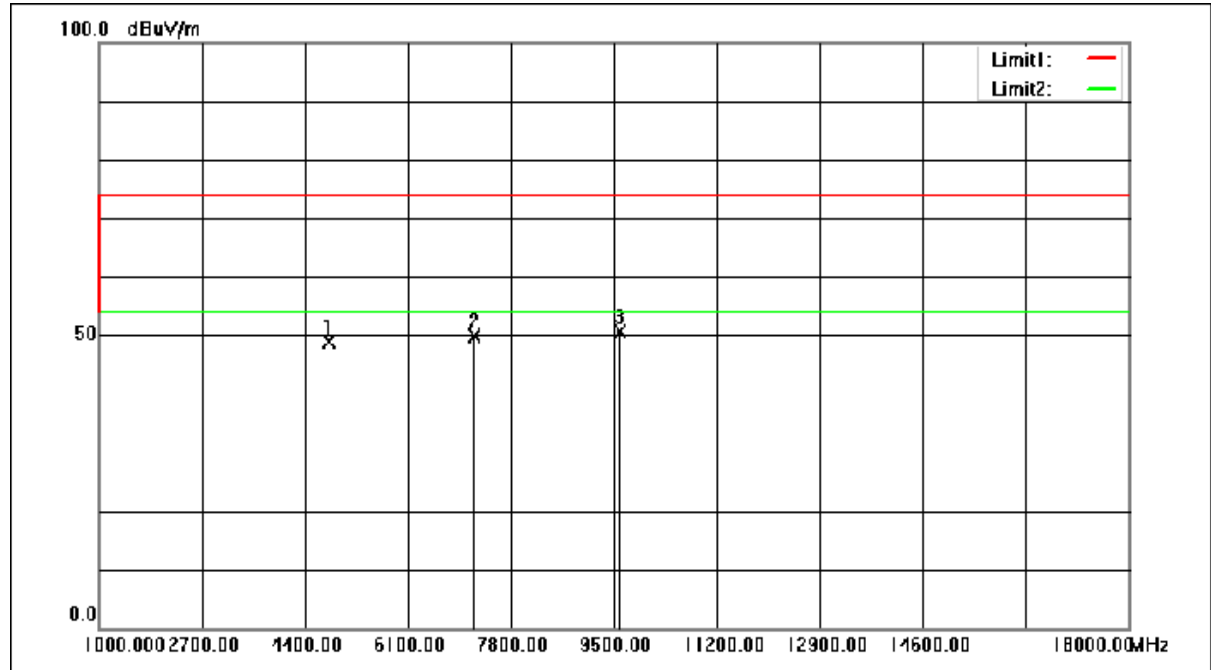
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Mode:e; Polarization:Horizontal; Modulation:8DPSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.76	-8.86	48.90	74.00	-25.10	peak
2	7206.000	55.65	-5.89	49.76	74.00	-24.24	peak
3	9608.000	51.85	-1.26	50.59	74.00	-23.41	peak

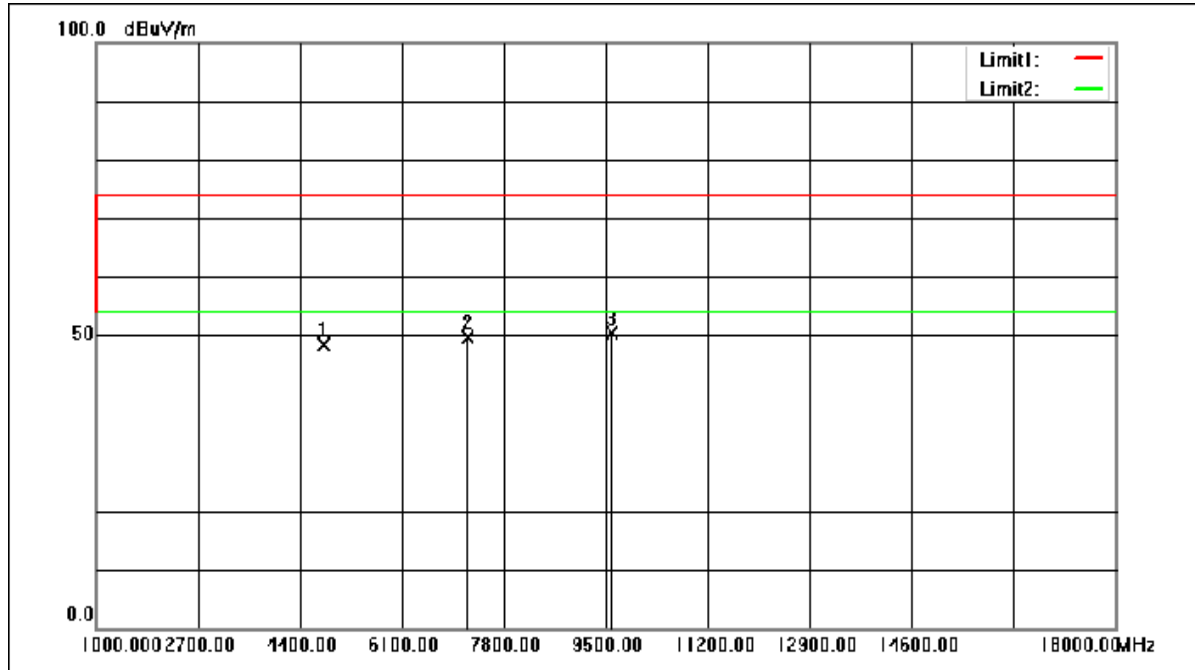


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Mode:e; Polarization:Vertical; Modulation:8DPSK; ; Channel:Low



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	57.15	-8.86	48.29	74.00	-25.71	peak
2	7206.000	55.43	-5.89	49.54	74.00	-24.46	peak
3	9608.000	51.71	-1.26	50.45	74.00	-23.55	peak



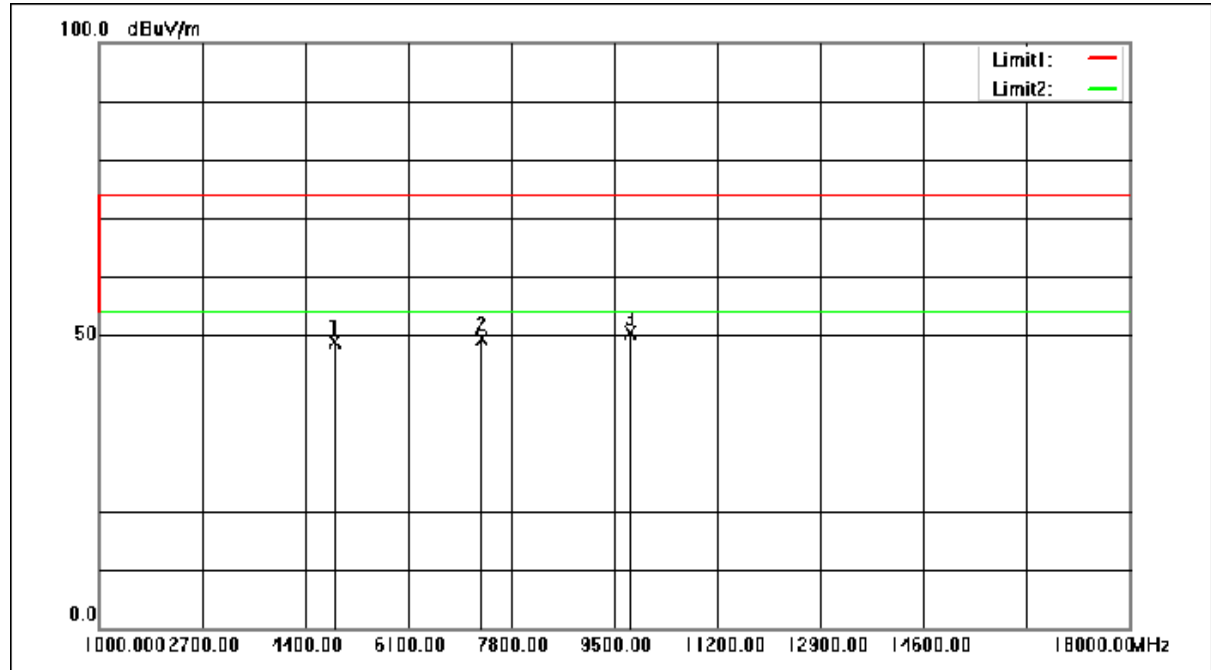
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Mode:e; Polarization:Horizontal; Modulation:8DPSK; ; Channel:middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.45	-8.58	48.87	74.00	-25.13	peak
2	7323.000	55.09	-5.77	49.32	74.00	-24.68	peak
3	9764.000	51.95	-1.46	50.49	74.00	-23.51	peak

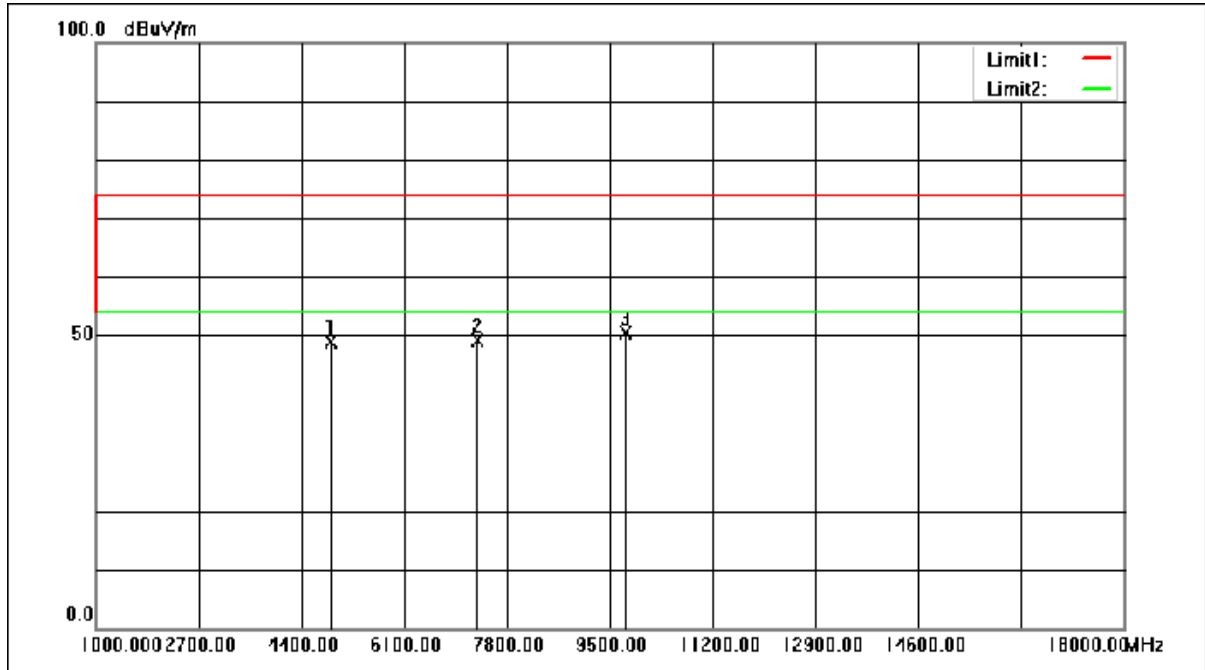


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Mode:e; Polarization:Vertical; Modulation:8DPSK; ; Channel:middle



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	57.55	-8.58	48.97	74.00	-25.03	peak
2	7323.000	54.81	-5.77	49.04	74.00	-24.96	peak
3	9764.000	51.83	-1.46	50.37	74.00	-23.63	peak

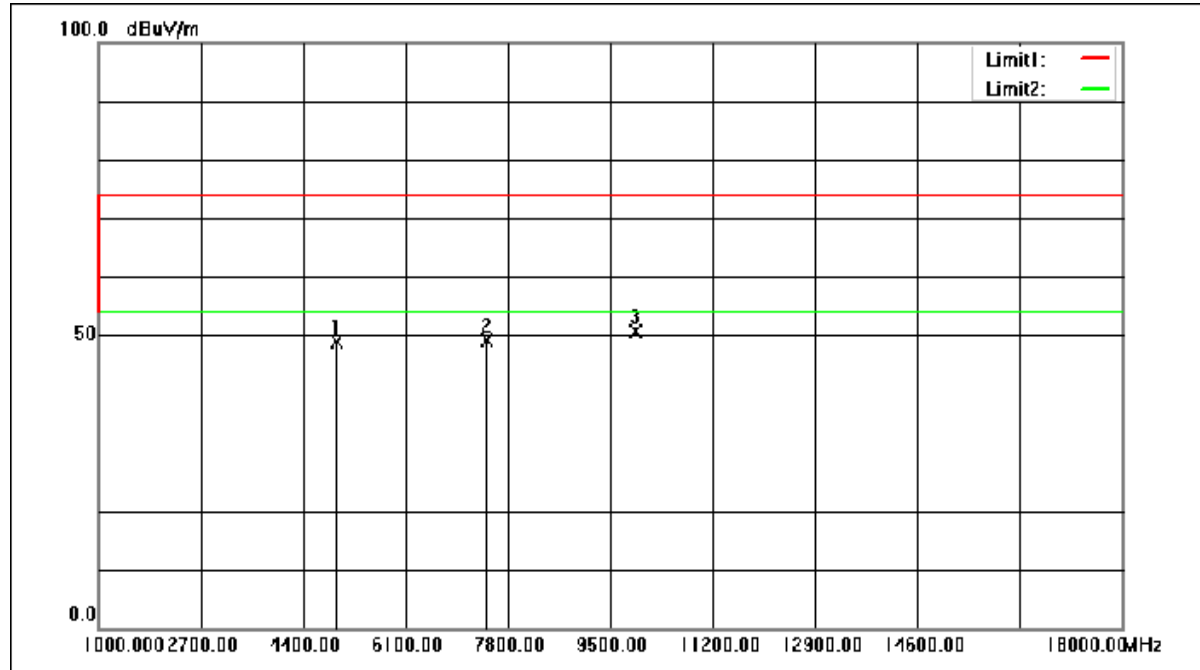


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Mode:e; Polarization:Horizontal; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	57.19	-8.32	48.87	74.00	-25.13	peak
2	7440.000	54.74	-5.63	49.11	74.00	-24.89	peak
3	9920.000	51.47	-0.94	50.53	74.00	-23.47	peak



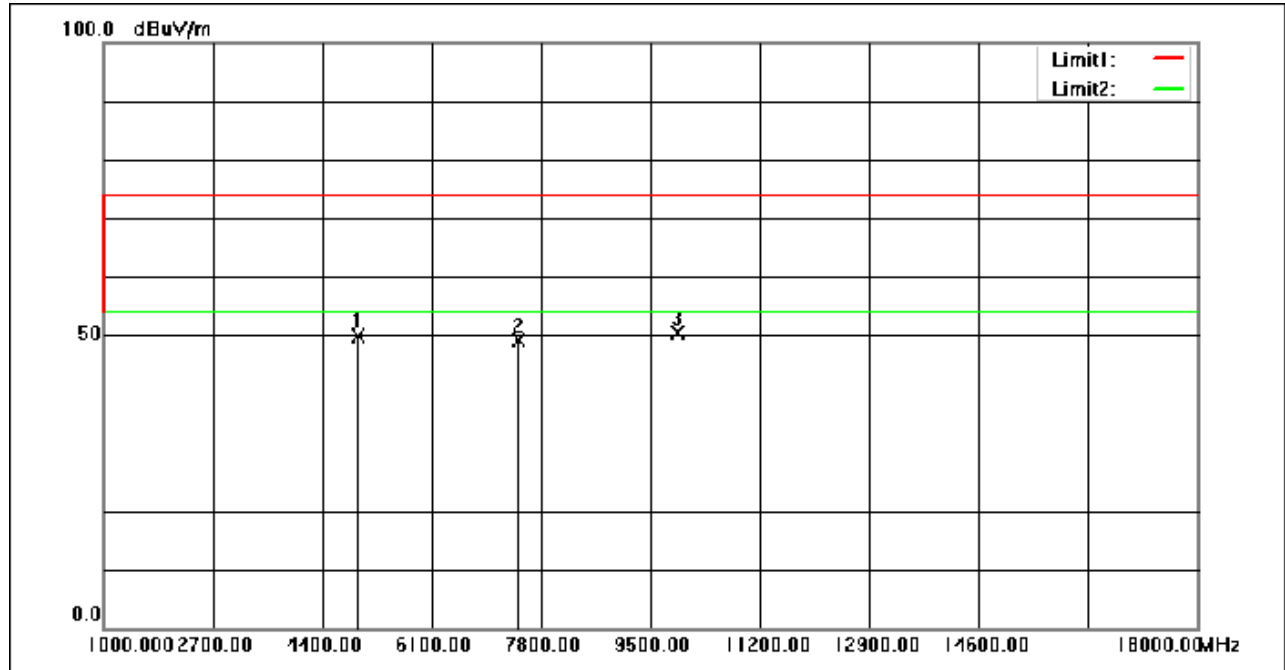
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Mode:e; Polarization:Vertical; Modulation:8DPSK; ; Channel:High



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	58.27	-8.32	49.95	74.00	-24.05	peak
2	7440.000	54.81	-5.63	49.18	74.00	-24.82	peak
3	9920.000	51.31	-0.94	50.37	74.00	-23.63	peak



**7.11 99% Bandwidth**

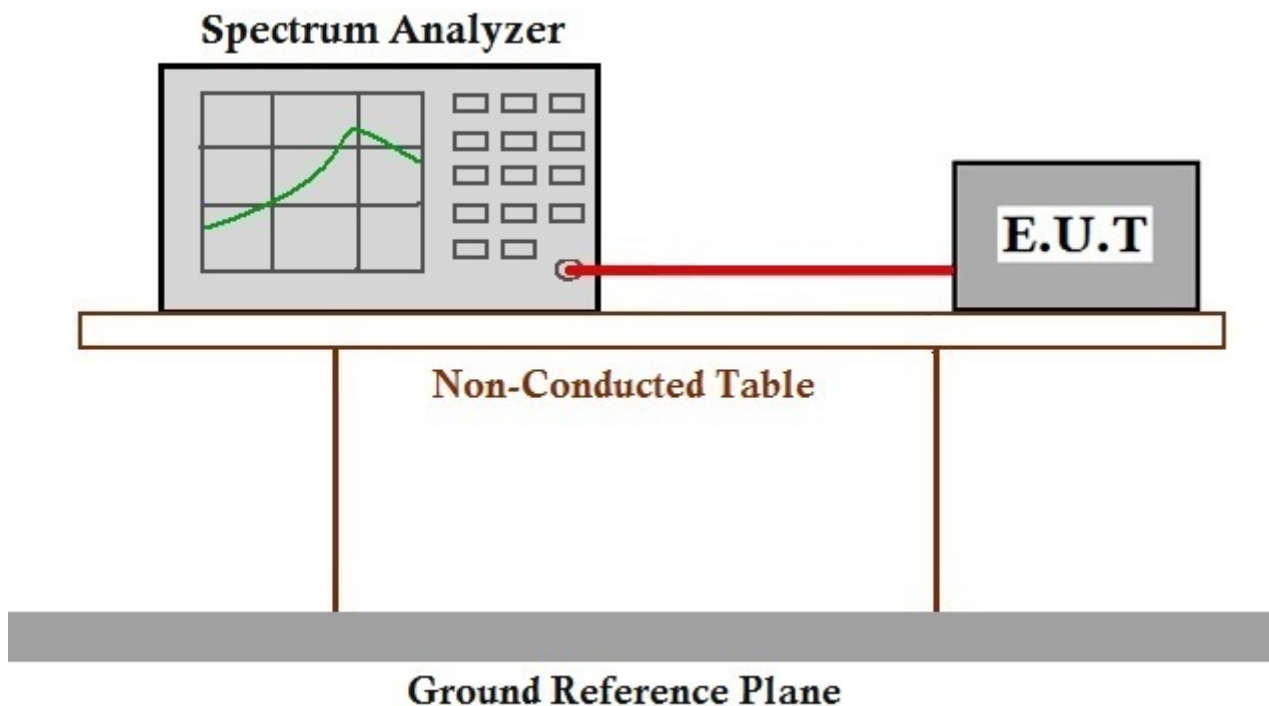
Test Requirement RSS-Gen Section 6.7  
 Test Method: ANSI C63.10 Section 6.9.3

**7.11.1 E.U.T. Operation**

Operating Environment:

Temperature: 24 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Test mode e:Module MT7668 TX\_non-Hop mode\_Keep the EUT in continuously transmitting mode with GFSK modulation,  $\pi/4$ DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

**7.11.2 Test Setup Diagram****7.11.3 Measurement Procedure and Data**

The detailed test data see: Appendix C for KSCR220100002803-FCC-BT-MT7668

**8 Test Setup Photographs**

Refer to the < Test Setup photos>.



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## 9 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -



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