

# TEST REPORT

**Application No.:** GZEM2009015373CR  
**Applicant:** Kyscho Multimedia Ltd  
**Address of Applicant:** Flat F; 5/F Valiant Ind. Ctr, 2-12 Au Pui Wan Street, Fo Tan, Shatin, HK  
**Manufacturer:** Huizhou Shenke Xinfei Technology Co. LTD  
**Address of Manufacturer:** Building C, Tangxia changjing Industrial Park, Huiyang District, Huizhou City  
**Factory:** Huizhou Shenke Xinfei Technology Co. LTD  
**Address of Factory:** Building C, Tangxia changjing Industrial Park, Huiyang District, Huizhou City  
**Equipment Under Test (EUT):**  
**EUT Name:** ROCKBOX XL BLUETOOTH SPEAKER  
**Model No.:** IMW999, IMW999-STL, IMW999-XXX (X can be A to Z)   
 Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.  
**Trade Mark:** ALTEC LANSING  
**Standard(s):** 47 CFR Part 15, Subpart E 15.407  
**Date of Receipt:** 2020-09-25  
**Date of Test:** 2020-10-15 to 2020-11-26  
**Date of Issue:** 2021-08-09

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.





Kobe Jian  
 EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-08-09		Original

<b>Authorized for issue by:</b>			
<b>Tested By</b>			
	<b>Curry_Wu /Project Engineer</b>		
<b>Checked By</b>			
	<b>Ricky_Liu /Reviewer</b>		



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## 2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.203	Pass
Transmission in the Absence of Data	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.407 (c)	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207 & 15.407 b(6)	Pass**
99% Bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 D	N/A	Pass
26dB Emission bandwidth	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 1	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Minimum 6 dB bandwidth (5.725-5.85 GHz band)	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II C 2	47 CFR Part 15, Subpart C 15.407 (e)	Pass
Maximum Conducted output power	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II E	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Peak Power spectrum density	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II F	47 CFR Part 15, Subpart C 15.407 (a)	Pass
Radiated Emissions	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass**
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & 15.407(b)	Pass
Frequency Stability	47 CFR Part 15, Subpart E 15.407	ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart C 15.407 (g)	Pass

N/A: Not applicable

\*\* : The EUT pass Conducted Emissions at AC Power Line (150kHz-30MHz), Radiated Emissions test after modification.

The KDB 789033 detail version is 789033 D02 General UNII Test Procedures New Rules v02r01 in this report.



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**✦ Declaration of EUT Family Grouping:**

**Model No.:** IMW999, IMW999-STL, IMW999-XXX (X can be A to Z)

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference on the model name, colour and decoration.

Therefore only one model **IMW999** was tested in this report.



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### 3 Contents

	Page
<b>1 Cover Page</b> .....	<b>1</b>
<b>2 Test Summary</b> .....	<b>3</b>
<b>3 Contents</b> .....	<b>5</b>
<b>4 General Information</b> .....	<b>7</b>
4.1 Details of E.U.T.....	7
4.2 Test frequencies.....	7
4.3 Description of Support Units.....	8
4.4 Measurement Uncertainty.....	8
4.5 Test Location.....	8
4.6 Test Facility.....	9
4.7 Deviation from Standards.....	10
4.8 Abnormalities from Standard Conditions.....	10
<b>5 Equipment List</b> .....	<b>11</b>
<b>6 Radio Spectrum Technical Requirement</b> .....	<b>15</b>
6.1 Antenna Requirement.....	15
6.1.1 Test Requirement:.....	15
6.1.2 Conclusion.....	15
6.2 Transmission in the Absence of Data.....	16
6.2.1 Test Requirement:.....	16
6.2.2 Conclusion.....	16
<b>7 Radio Spectrum Matter Test Results</b> .....	<b>17</b>
7.1 Conducted Emissions at AC Power Line (150kHz-30MHz).....	17
7.1.1 E.U.T. Operation.....	17
7.1.2 Test Setup Diagram.....	18
7.1.3 Measurement Procedure and Data.....	18
7.2 99% Bandwidth.....	21
7.2.1 E.U.T. Operation.....	21
7.2.2 Test Setup Diagram.....	21
7.2.3 Measurement Procedure and Data.....	21
7.3 26dB Emission bandwidth.....	22
7.3.1 E.U.T. Operation.....	22
7.3.2 Test Setup Diagram.....	22
7.3.3 Measurement Procedure and Data.....	22
7.4 Minimum 6 dB bandwidth (5.725-5.85 GHz band).....	23
7.4.1 E.U.T. Operation.....	23
7.4.2 Test Setup Diagram.....	23
7.4.3 Measurement Procedure and Data.....	23
7.5 Maximum Conducted output power.....	24
7.5.1 E.U.T. Operation.....	24
7.5.2 Test Setup Diagram.....	25



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7.5.3	Measurement Procedure and Data .....	25
7.6	Peak Power spectrum density .....	26
7.6.1	E.U.T. Operation.....	26
7.6.2	Test Setup Diagram.....	27
7.6.3	Measurement Procedure and Data .....	27
7.7	Radiated Emissions .....	28
7.7.1	E.U.T. Operation.....	28
7.7.2	Test Setup Diagram.....	29
7.7.3	Measurement Procedure and Data .....	30
7.8	Radiated Emissions which around the fundamental frequency.....	39
7.8.1	E.U.T. Operation.....	40
7.8.2	Test Setup Diagram.....	41
7.8.3	Measurement Procedure and Data .....	42
7.9	Frequency Stability .....	47
7.9.1	E.U.T. Operation.....	47
7.9.2	Test Setup Diagram.....	47
7.9.3	Measurement Procedure and Data .....	47
<b>8</b>	<b>Photographs .....</b>	<b>48</b>
8.1	Conducted Emissions at AC Power Line (150kHz-30MHz) Test Setup .....	48
8.2	Radiated Emissions Test Setup.....	48
8.3	Radiated Emissions which fall in the restricted bands Test Setup .....	49
8.4	EUT Constructional Details.....	50
<b>9</b>	<b>Appendix .....</b>	<b>51</b>
9.1	Appendix 15.407 .....	51
9.2	Appendix A1: 26dB Emission Bandwidth .....	51
9.2.1	Test Result .....	51
9.2.2	Test Graphs.....	52
9.3	Appendix A2: Occupied channel bandwidth .....	54
9.3.1	Test Result .....	54
9.3.2	Test Graphs.....	55
9.4	Appendix A3: Min 6dB emission bandwidth .....	57
9.4.1	Test Result .....	57
9.4.2	Test Graphs.....	58
9.5	Appendix B: Maximum conducted output power .....	60
9.5.1	Test Result .....	60
9.5.2	Test Graphs.....	61
9.6	Appendix C: Maximum power spectral density.....	63
9.6.1	Test Result .....	63
9.6.2	Test Graphs.....	64
9.7	Appendix D: Band edge measurements.....	66
9.7.1	Test Result .....	66
9.7.2	Test Graphs.....	67
9.8	Appendix E: Frequency Stability.....	68
9.8.1	Test Result .....	68
9.9	Appendix F: Duty Cycle .....	70
9.9.1	Test Result .....	70



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## 4 General Information

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

Power Supply:	Charging by adaptor: Model: MLF-E021802500CU INPUT:AC 100-240V 60/60Hz 1.5A max OUTPUT: DC 18V 2.5A DC 14.8V supply by internal rechargeable battery(2400mAh)
Test Voltage:	AC 120V 60Hz &DC 14.8V
Antenna Gain:	0dBi
Antenna Type:	Integral Antenna
Modulation Type	GFSK
Number of Channels	16
Operation Frequency	5727MHz-5800MHz
TPC Function:	Not support
Sample No.	A1
Testing software	N/A
Power setting	Default

### 4.2 Test frequencies

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5727	9	5767
2	5731	10	5771
3	5734	11	5773
4	5738	12	5774
5	5749	13	5778
6	5753	14	5789
7	5756	15	5796
8	5760	16	5800

Remark: Test frequencies are lowest channel: 5727 MHz, middle channel: 5760 MHz and highest channel: 5800 MHz



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### 4.3 Description of Support Units

The EUT has been tested as an independent unit.

### 4.4 Measurement Uncertainty

RF

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.5 \times 10^{-8}$
2	Duty cycle	$\pm 0.57\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF Conducted power	$\pm 0.68\text{dB}$
5	RF Power Density	$\pm 1.50\text{dB}$
6	Conducted Spurious Emissions	$\pm 1.04\text{dB}$
7	RF Radiated Power	$\pm 4.5\text{dB}$ (below 1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious Emission Test	$\pm 4.5\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
9	Temperature	$\pm 0.4^\circ\text{C}$
10	Humidity	$\pm 1.3\%$
11	Supply Voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

### 4.5 Test Location

All tests were performed at:

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 198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,  
 Guangzhou, China 510663

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No tests were sub-contracted.



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#### 4.6 Test Facility

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

● **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

● **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

● **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to

ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

● **FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)**

SGS-CSTC Standards Technical Services 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. Registration 282399, May 31, 2002.

● **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

● **Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● **VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-10449 and T-11179 respectively.

● **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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#### 4.7 Deviation from Standards

None

#### 4.8 Abnormalities from Standard Conditions

\*\* : The EUT passed Conducted Emissions at AC Power Line (150kHz-30MHz) , Radiated Emissions test after modification.



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## 5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	N/A	N/A
Two-Line V-Network	Rohde & Schwarz	ENV216	EMC0118	2020-01-10	2021-01-09
LISN	Rohde & Schwarz	ENV216	EMC2135	2020-09-25	2021-09-24
EMI Test Receiver	Rohde & Schwarz	ESCS30	EMC0506	2020-11-13	2021-11-12
Coaxial Cable	HangTianXing	2m	EMC0107	2020-09-09	2022-09-08
Voltage Probe	SGS-EMC	N/A	EMC0106	2019-05-10	2021-05-09
Conical Metal Housing	SGS-EMC	N/A	EMC0167	2020-04-19	2022-04-18
Test Software E3c	Audix	Ver. 5.4.1221b	GZE100-62	N/A	N/A

99% Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	2020-03-02	2021-03-01
ESG Vector Signal Generator	Keysight	E4438C	SEM006-03	2020-03-31	2021-03-30
EXG Analog Signal Generator	AgilentTechnologies	N5171B	SEM006-04	2020-07-15	2021-07-14
Power Meter	AgilentTechnologies	U2021XA_Ch2	SEM009-02	2020-05-26	2021-05-25
Power Meter	AgilentTechnologies	U2021XA_Ch3	SEM009-03	2020-05-26	2021-05-25
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

26dB Emission bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01



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<b>Minimum 6 dB bandwidth (5.725-5.85 GHz band)</b>					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

<b>Maximum Conducted output power</b>					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

<b>Peak Power spectrum density</b>					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer	AgilentTechnologies	N9010A	EMC2138	2020-09-17	2021-09-16
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

<b>Frequency Stability &amp; Duty Cycle</b>					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	2020-03-02	2021-03-01
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01
High-low temperature control box	GZ GongWen Co.Ltd.	GDJW-100	EMC0039	2021-07-04	2022-07-03



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Transmission in the Absence of Data					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
MXA Signal Analyzer	AgilentTechnologies	N9020A	SEM004-10	2020-03-02	2021-03-01
ESG Vector Signal Generator	Keysight	E4438C	SEM006-03	2020-03-31	2021-03-30
EXG Analog Signal Generator	AgilentTechnologies	N5171B	SEM006-04	2020-07-15	2021-07-14
Power Meter	AgilentTechnologies	U2021XA_Ch2	SEM009-02	2020-05-26	2021-05-25
Power Meter	AgilentTechnologies	U2021XA_Ch3	SEM009-03	2020-05-26	2021-05-25
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01
MI CABLE	SGS-EMC	0.8M	EMC2137	2019-11-02	2021-11-01

15GHz-40GHz Radiated Emission & Spurious Emission						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC2172	Microwave Broadband Pre-amplifier (18-40GHz)	Schwarzbeck	BBV 9721	41	2020-09-09	2021-09-08
EMC2041	Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	BBHA917 0375	2020-06-28	2023-06-27
SEM003-1 5	Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	BBHA917 0374	2020-11-14	2023-11-13
EMC2142	966 Anechoic Chamber	Shenzhen C.R.T Technology Co., LTD	9X6X6	NA	2017-12-19	2020-12-18
EMC2138	EXA Signal Analyzer (10Hz-44GHz)	KEYSIGHT	N9010A	MY57120 105	2020-09-17	2021-09-16
EMC2026	Horn Antenna 1-18GHz	Schwarzbeck	BBHA 9120D	9120D-84 1	2019-09-25	2022-09-24
EMC0521	Pre-Amplifier (1-26.5GHz)	Agilent	8449B	3008A016 49	2020-01-10	2021-01-09
SEM006-0 5	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY53270 267	2020-09-23	2021-09-22



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Below 18G Radiated Emission						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date	Cal. Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2019-10-20	2022-10-19
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2020-01-10	2021-01-09
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2020-01-10	2021-01-09
EMC2174	Trilog Broadband Antenna 30-1000MHz	SCHWARZBEC K MESS-ELEKTRONIK	VULB 9168	0920	2018-09-06	2021-09-05
SEM003-18	Trilog Broadband Antenna 25-2000MHz	SCHWARZBEC K MESS-ELEKTRONIK	VULB 9168	00666	2019-02-22	2022-02-22
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2020-06-08	2023-06-07
EMC2026	Horn Antenna	SCHWARZBEC K MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2019-09-25	2022-09-24
EMC0518	Horn Antenna (1G~18G)	R & S	HF906	100096	2018-09-02	2021-09-01
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2020-01-10	2021-01-09
EMC2065	Amplifier	HP	8447F	N/A	2020-05-26	2021-05-25
EMC2086	PRE AMPLIFIER MH648A	ANRITSU CORP	MH648A	N/A	2020-11-13	2021-11-12
EMC0523	Active Loop Antenna	EMCO	6502	42963	2020-05-19	2022-05-18
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBEC K MESS-ELEKTRONIK	BBHA 9170	9170-375	2020-06-16	2023-06-15
EMC2142	966 Anechoic Chamber	C.R.T	9mX6mX6m	NA	2017-12-19	2020-12-18
EMC2139	MXE EMI Receiver	Keysight	N9038A	MY57290121	2020-11-13	2021-11-12



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EMC2138	EXA Signal Analyzer	Keysight	N9010A	MY57120105	2020-09-17	2021-09-16
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2019-10-20	2022-10-19

General used equipment						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
DMM	Fluke	73	EMC0006	2020-07-09	2021-07-08	
DMM	Fluke	73	EMC0007	2020-07-09	2021-07-08	

## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

#### 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

Antenna photo please refer to internal photo.

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.



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## 6.2 Transmission in the Absence of Data

### 6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.407 (c)

### 6.2.2 Conclusion

Standard Requirement:

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information, or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

Applicants shall include in their application for equipment authorization a description of how this requirement is met.

EUT Details:

Wireless chip support automatically discontinue transmission in case of either absence of information to transmit or operational failure, if the chip detects absence of information to transmit or operational failure, it will be automatically shut off.



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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 & 15.407 b(6)  
 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.

#### 7.1.1 E.U.T. Operation

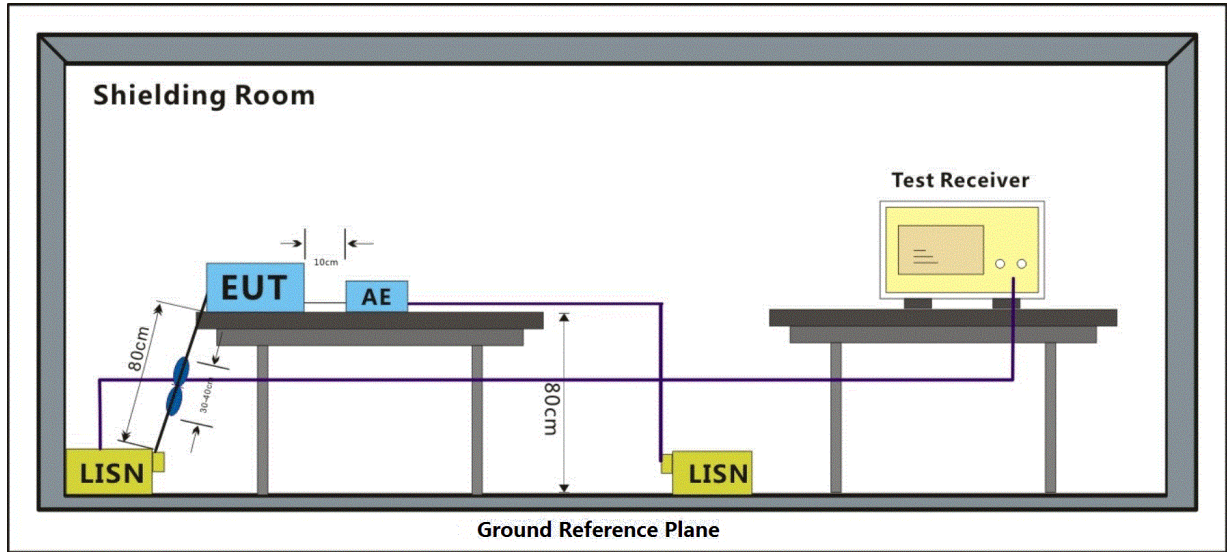
Operating Environment:

Temperature: 25.3 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar  
 Test mode: i:Charge + TX mode (Band 3)\_Keep the EUT in charging and continuously transmitting mode with GFSK modulation type.



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**7.1.2 Test Setup Diagram**



**7.1.3 Measurement Procedure and Data**

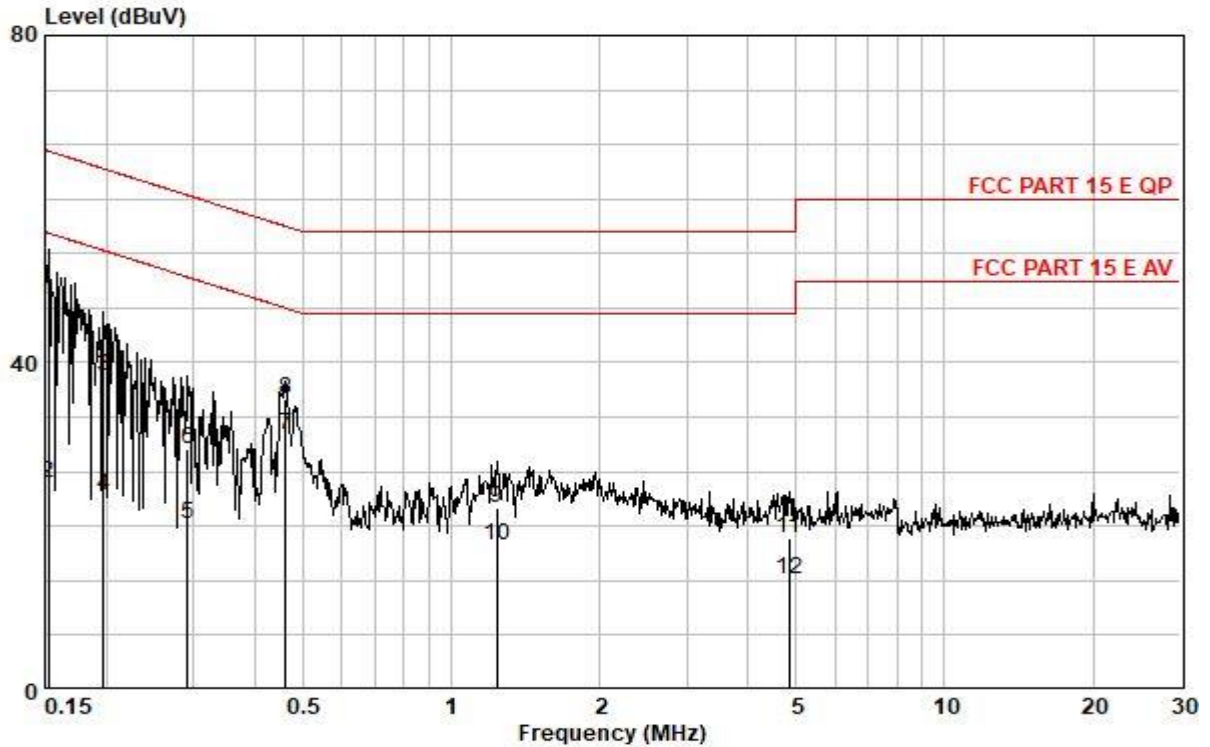
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

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



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Mode: I; Line: Live Line



Pol :LIVE  
Mode :  
Model :

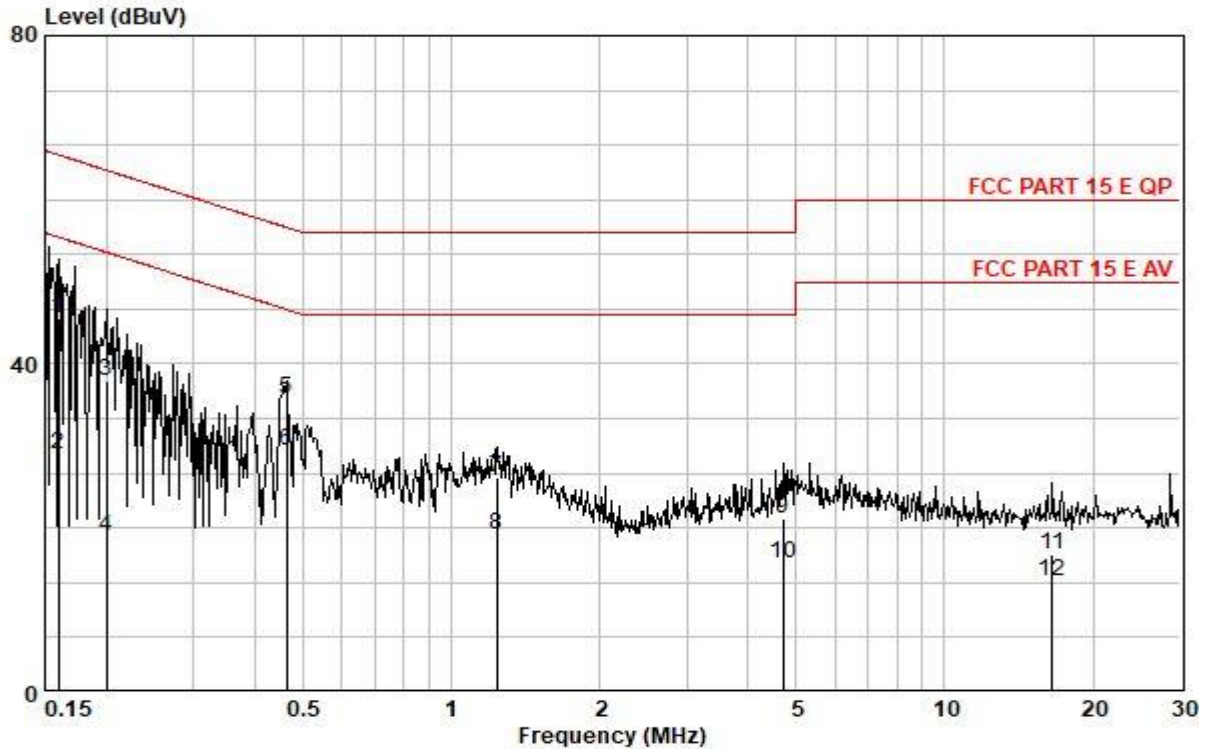
Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark
0.15	37.92	0.06	9.61	47.59	65.87	-18.28	QP
0.15	15.72	0.06	9.61	25.39	55.87	-30.48	AVERAGE
0.20	28.80	0.06	9.60	38.46	63.71	-25.25	QP
0.20	14.18	0.06	9.60	23.84	53.71	-29.87	AVERAGE
0.29	10.70	0.06	9.60	20.36	50.46	-30.09	AVERAGE
0.29	19.79	0.06	9.60	29.45	60.46	-31.00	QP
0.46	21.42	0.07	9.61	31.10	46.67	-15.58	AVERAGE
0.46	25.78	0.07	9.61	35.46	56.67	-21.22	QP
1.24	12.55	0.09	9.61	22.25	56.00	-33.75	QP
1.24	7.86	0.09	9.61	17.56	46.00	-28.44	AVERAGE
4.85	8.63	0.18	9.65	18.46	56.00	-37.54	QP
4.85	3.76	0.18	9.65	13.59	46.00	-32.41	AVERAGE



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Mode: I; Line: Neutral Line



Pol : NEUTRAL  
Mode :  
Model :

Frequency MHz	read level dBuV	Cable Loss dB	LISN Factor dB	Measured level dBuV	Limit Line dBuV	Over limit dB	Remark
0.16	35.84	0.06	9.62	45.51	65.47	-19.96	QP
0.16	19.32	0.06	9.62	28.99	55.47	-26.48	AVERAGE
0.20	28.33	0.06	9.62	38.01	63.62	-25.61	QP
0.20	9.23	0.06	9.62	18.91	53.62	-34.71	AVERAGE
0.46	26.00	0.07	9.64	35.71	56.63	-20.92	QP
0.46	19.68	0.07	9.64	29.39	46.63	-17.24	AVERAGE
1.24	16.28	0.09	9.69	26.06	56.00	-29.94	QP
1.24	9.37	0.09	9.69	19.15	46.00	-26.85	AVERAGE
4.70	11.20	0.18	9.81	21.19	56.00	-34.81	QP
4.70	5.71	0.18	9.81	15.70	46.00	-30.30	AVERAGE
16.57	6.33	0.33	10.12	16.78	60.00	-43.22	QP
16.57	3.01	0.33	10.12	13.46	50.00	-36.54	AVERAGE



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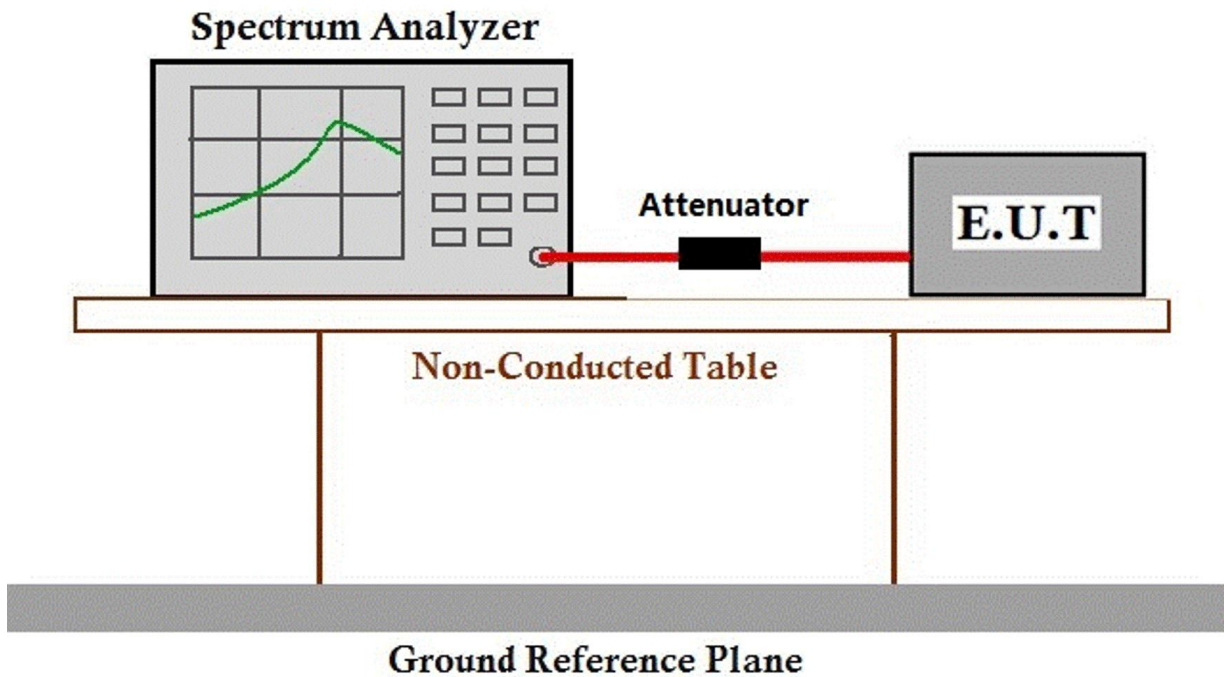
## 7.2 99% Bandwidth

Test Requirement N/A  
 Test Method: KDB 789033 D02 D

### 7.2.1 E.U.T. Operation

Operating Environment:  
 Temperature: 23.5 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar  
 Test Mode: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

### 7.2.2 Test Setup Diagram



### 7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407



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### 7.3 26dB Emission bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)

Test Method: KDB 789033 D02 II C 1

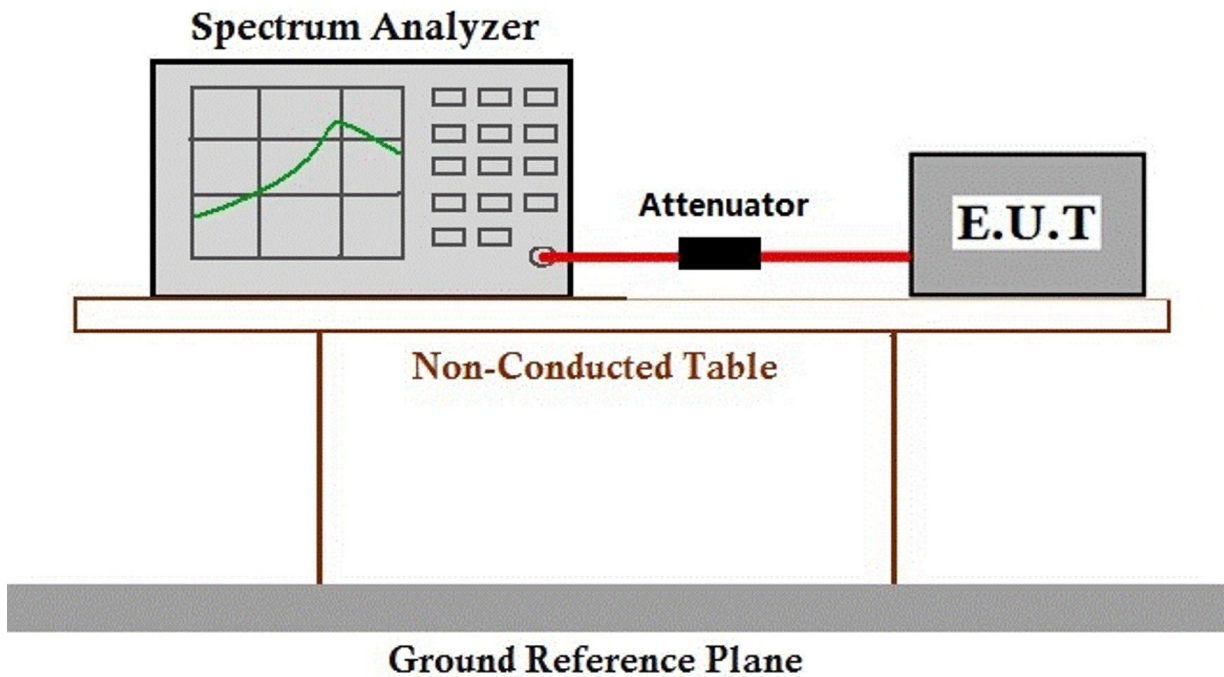
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar

Test Mode: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

#### 7.3.2 Test Setup Diagram



#### 7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407



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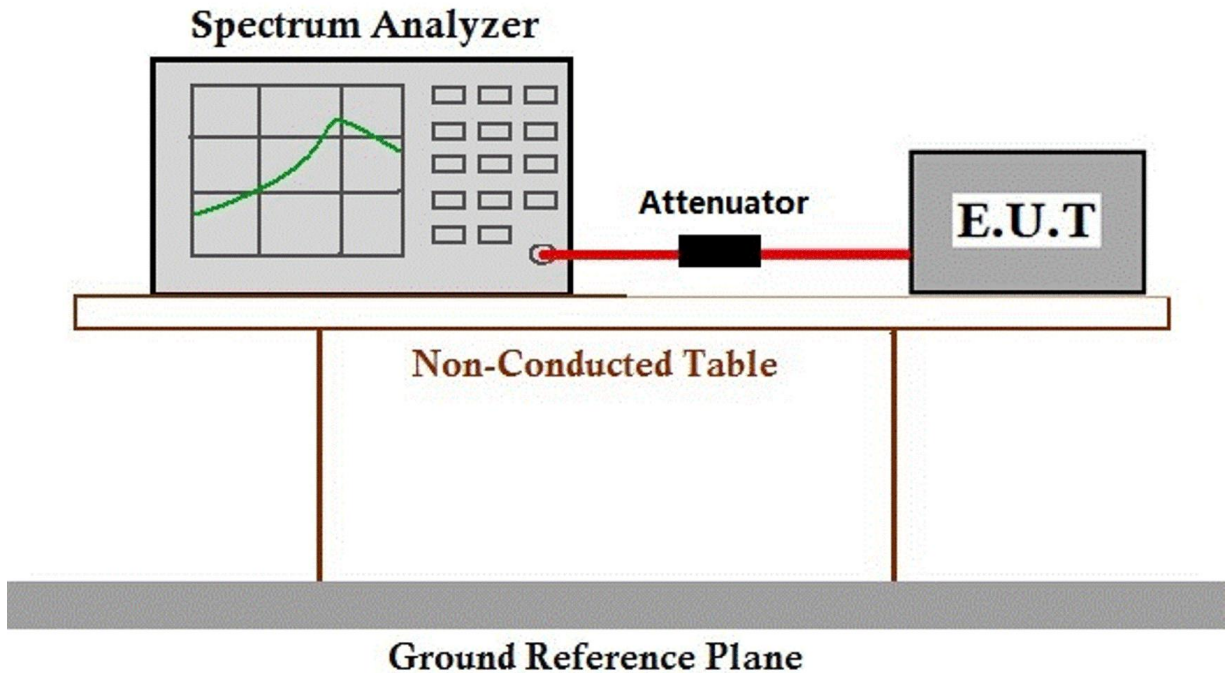
### 7.4 Minimum 6 dB bandwidth (5.725-5.85 GHz band)

Test Requirement: 47 CFR Part 15, Subpart C 15.407 (e)  
 Test Method: KDB 789033 D02 II C 2  
 Limit: ≥500 kHz

#### 7.4.1 E.U.T. Operation

Operating Environment:  
 Temperature: 23.6 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar  
 Test Mode: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

#### 7.4.2 Test Setup Diagram



#### 7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407



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**7.5 Maximum Conducted output power**

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)  
 Test Method: KDB 789033 D02 II E  
 Limit:

Frequency band(MHz)	Limit
5150-5250	≤1W(30dBm) for master device
	≤250mW(24dBm) for client device
5250-5350	≤250mW(24dBm) for client device or 11dBm+10logB*
5470-5725	≤250mW(24dBm) for client device or 11dBm+10logB*
5725-5850	≤1W(30dBm)
Remark:	* Where B is the 26dB emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

**7.5.1 E.U.T. Operation**

Operating Environment:

Temperature: 23.6 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar

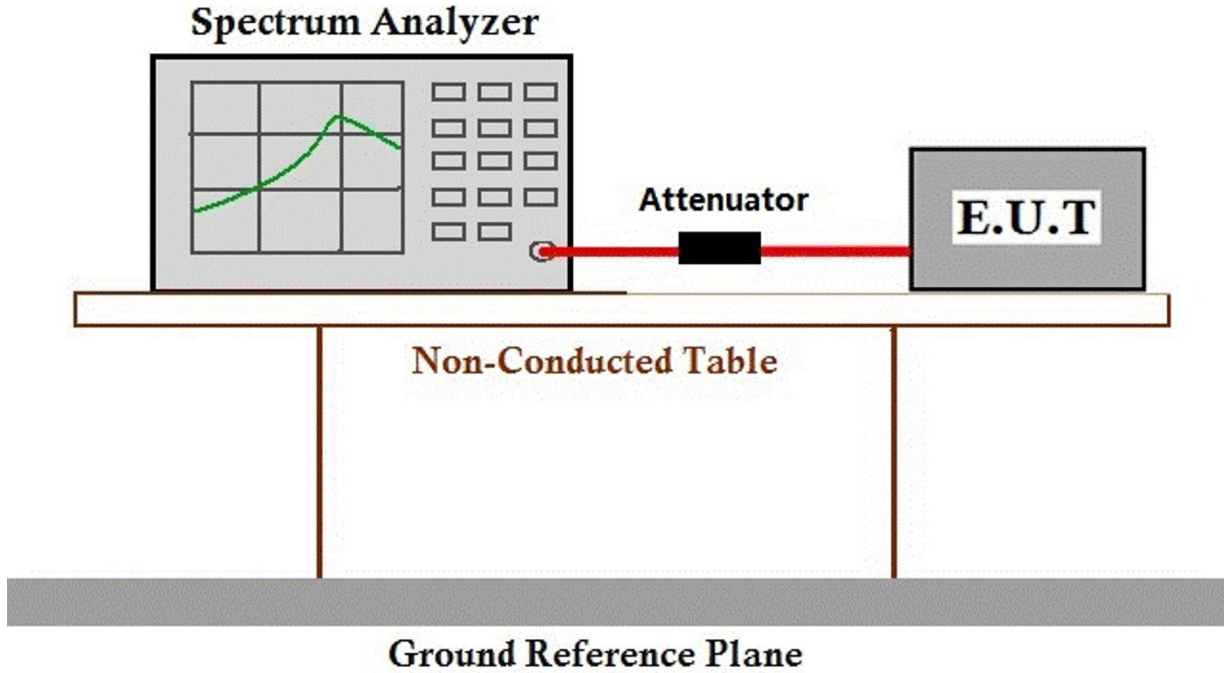
Test Mode: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.



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### 7.5.2 Test Setup Diagram



### 7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407



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**7.6 Peak Power spectrum density**

Test Requirement 47 CFR Part 15, Subpart C 15.407 (a)  
 Test Method: KDB 789033 D02 II F  
 Limit:

Frequency band(MHz)	Limit
5150-5250	≤17dBm in 1MHz for master device
	≤11dBm in 1MHz for client device
5250-5350	≤11dBm in 1MHz for client device
5470-5725	≤11dBm in 1MHz for client device
5725-5850	≤30dBm in 500 kHz
Remark:	The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.

**7.6.1 E.U.T. Operation**

Operating Environment:

Temperature: 23.6 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar

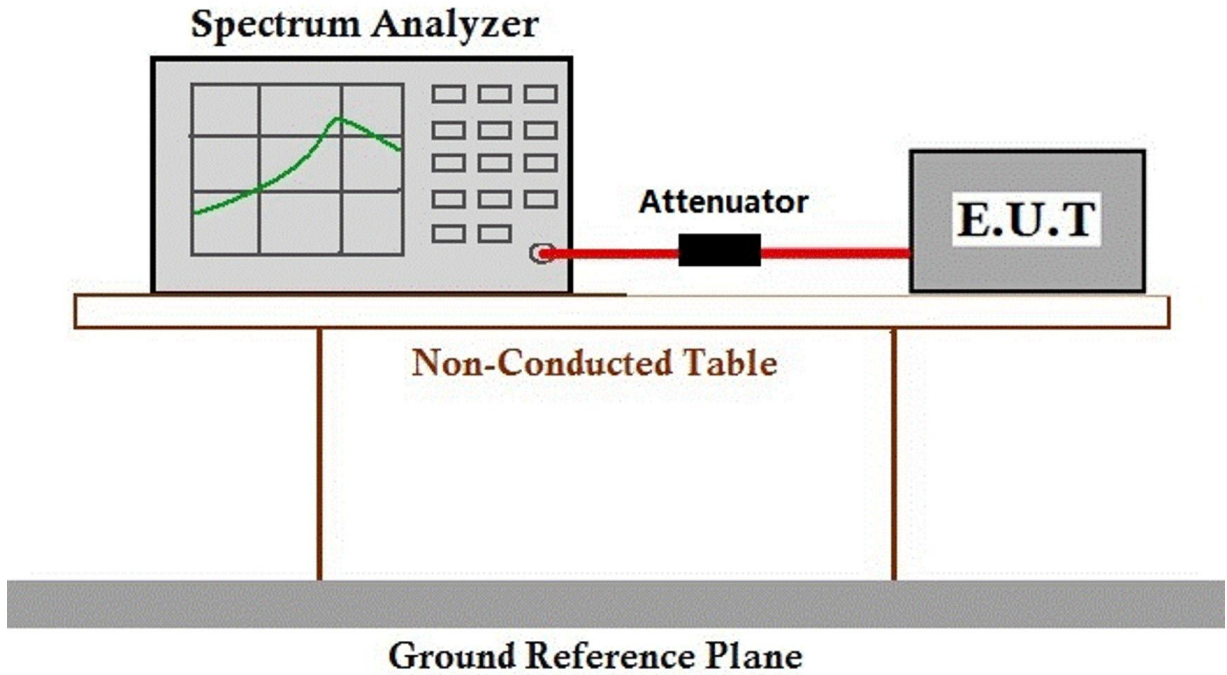
Test Mode: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.



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### 7.6.2 Test Setup Diagram



### 7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407



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## 7.7 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.407(b)

Test Method: KDB 789033 D02 II G

Measurement Distance: 3m

### 7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Pretest these h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

worst case: i:Charge + TX mode (Band 3)\_Keep the EUT in charging and continuously transmitting mode with GFSK modulation type.

w: TX mode (Band 2.4G BT)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

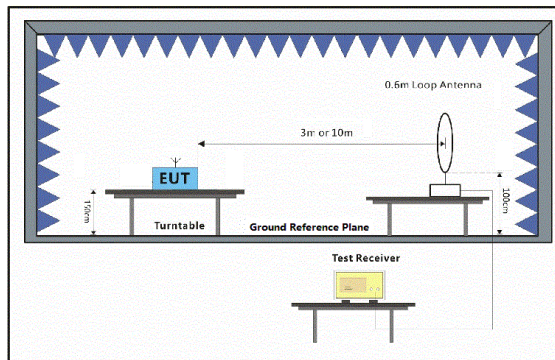
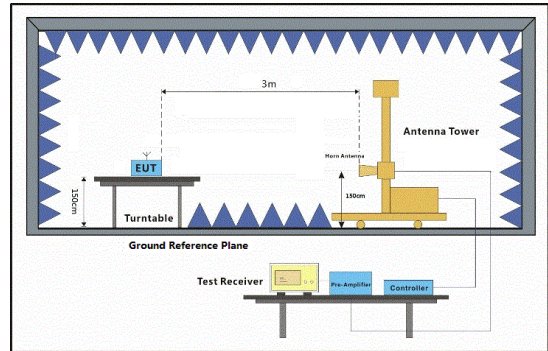
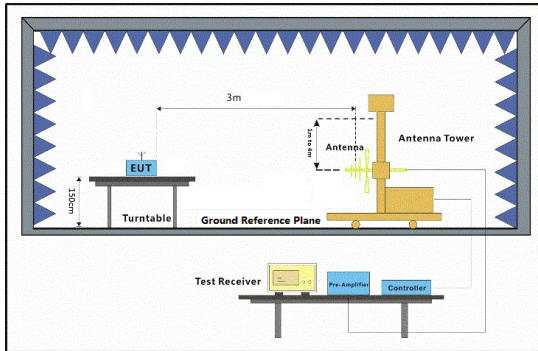
The worst case w: Charge +TX mode (Band 2.4G BT)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.



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### 7.7.2 Test Setup Diagram



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**7.7.3 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.

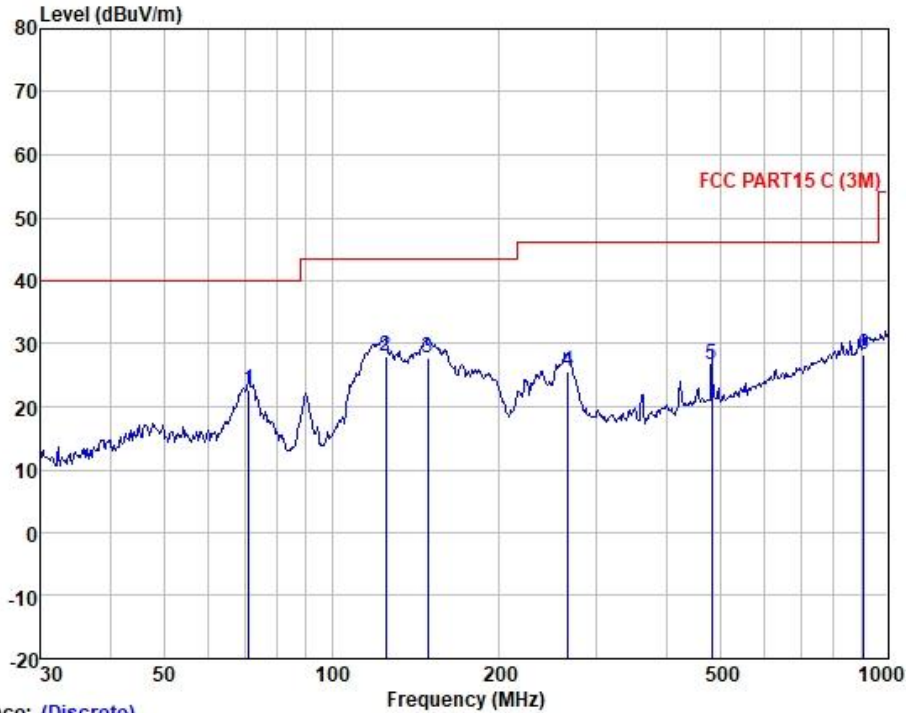
Remark:

- 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
- 2. For emission below 1GHz, through the pre-scan lowest/ middle / highest channel found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 3. Scan from 9kHz to 40GHz, 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. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.  
 Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor
- 5. Pretest performed with Bluetooth mode and Band 3 emission mode in low/ middle /high channel.  
 Find the worst-case mode is EUT in charging and Bluetooth emission mode at lowest channel. Therefore Only the worst-case data record in the report.



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 Guangzhou Branch, Inspection & Testing Services Co., Ltd. EEC Laboratory. 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

Mode: w; Polarization: Horizontal; GFSK; Channel: Low



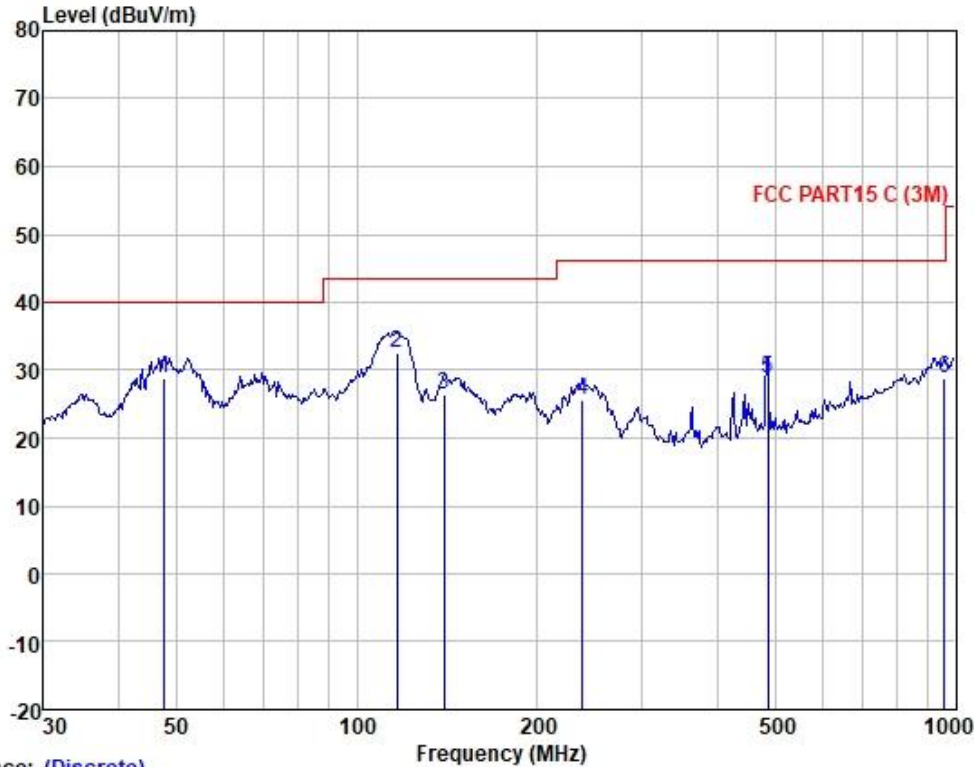
Trace: (Discrete)  
 Site : SGS  
 Condition: FCC PART15 C (3M) 3m HORIZONTAL  
 Job :  
 Model :  
 Power : AC  
 Test Mode: BT

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over		
	MHz	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	71.080	36.65	11.70	1.41	27.12	22.64	40.00	-17.36	HORIZONTAL QP
2	125.007	41.62	11.50	1.80	27.01	27.91	43.50	-15.59	HORIZONTAL QP
3	148.963	38.90	13.75	2.05	26.84	27.86	43.50	-15.64	HORIZONTAL QP
4	266.609	36.91	12.50	2.72	26.58	25.55	46.00	-20.45	HORIZONTAL QP
5	482.216	32.88	17.63	4.08	27.92	26.67	46.00	-19.33	HORIZONTAL QP
6	906.482	26.40	23.37	6.44	27.84	28.37	46.00	-17.63	HORIZONTAL QP



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Mode: w; Polarization: vertical ; GFSK; Channel: Low



Trace: (Discrete)

Site : SGS  
 Condition: FCC PART15 C (3M) 3m VERTICAL  
 Job :  
 Model :  
 Power : AC  
 Test Mode: BT

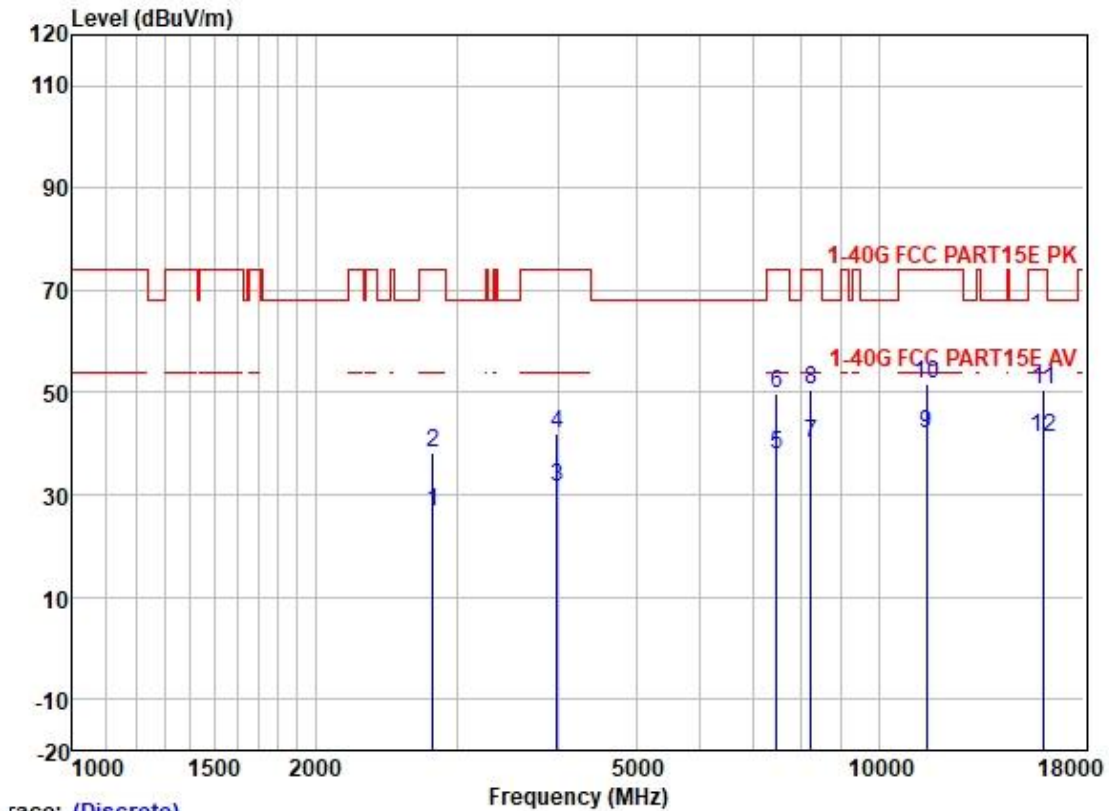
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	47.659	40.88	13.99	1.19	27.17	28.89	40.00	-11.11	VERTICAL QP
2	116.540	47.17	10.70	1.75	27.04	32.58	43.50	-10.92	VERTICAL QP
3	139.851	38.01	13.30	1.97	26.93	26.35	43.50	-17.15	VERTICAL QP
4	238.310	37.98	11.74	2.67	26.67	25.72	46.00	-20.28	VERTICAL QP
5	485.609	35.08	17.70	4.06	27.93	28.91	46.00	-17.09	VERTICAL QP
6	958.794	26.12	23.90	6.52	27.73	28.81	46.00	-17.19	VERTICAL QP



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Mode:h; Polarization:Horizontal; GFSK ; Channel:Low



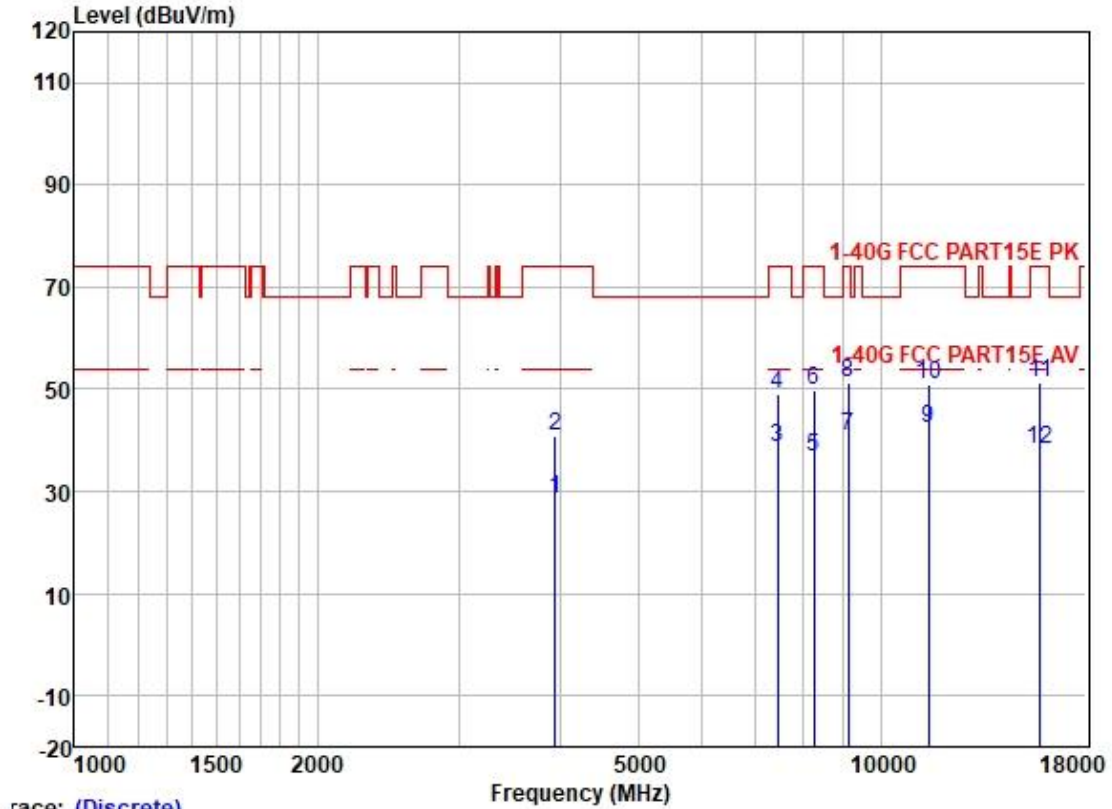
Trace: (Discrete)

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2798.189	31.38	28.13	3.70	36.73	26.48	54.00	-27.52	HORIZONTAL	Average
2	2798.189	43.12	28.13	3.70	36.73	38.22	74.00	-35.78	HORIZONTAL	Peak
3	3992.781	33.36	29.79	4.60	36.40	31.35	54.00	-22.65	HORIZONTAL	Average
4	3992.781	43.82	29.79	4.60	36.40	41.81	74.00	-32.19	HORIZONTAL	Peak
5	7476.006	32.08	36.36	6.25	36.77	37.92	54.00	-16.08	HORIZONTAL	Average
6	7476.006	43.83	36.36	6.25	36.77	49.67	74.00	-24.33	HORIZONTAL	Peak
7	8248.005	33.42	37.00	6.43	36.76	40.09	54.00	-13.91	HORIZONTAL	Average
8	8248.005	43.98	37.00	6.43	36.76	50.65	74.00	-23.35	HORIZONTAL	Peak
9	11454.600	29.89	39.91	8.37	36.38	41.79	54.00	-12.21	HORIZONTAL	Average
10	11454.600	39.71	39.91	8.37	36.38	51.61	74.00	-22.39	HORIZONTAL	Peak
11	16034.730	38.90	38.41	9.82	36.48	50.65	74.00	-23.35	HORIZONTAL	Peak
12	16034.730	29.62	38.41	9.82	36.48	41.37	54.00	-12.63	HORIZONTAL	Average



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Mode:h; Polarization:Vertical; GFSK; Channel:Low



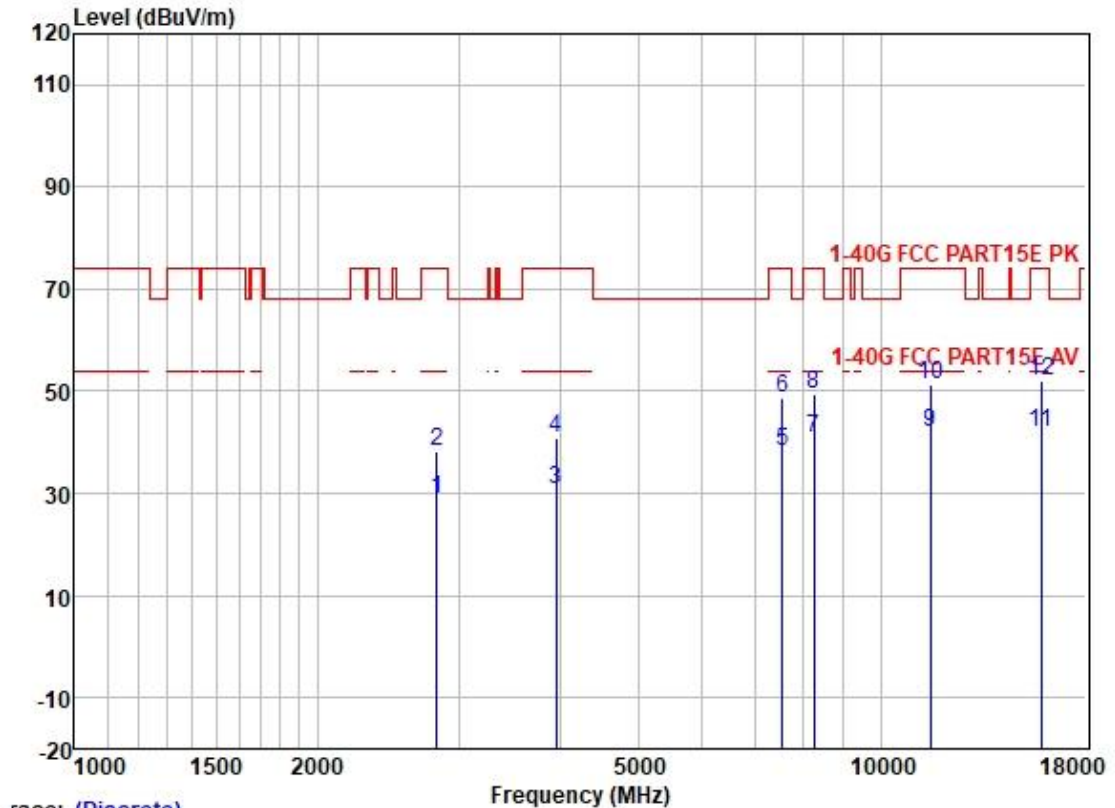
Trace: (Discrete)

	Read	Antenna	Cable	Preamp	Level	Limit	Over		
	Freq	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB		
1	3946.885	30.55	29.74	4.60	36.40	28.49	54.00	-25.51	VERTICAL Average
2	3946.885	43.06	29.74	4.60	36.40	41.00	74.00	-33.00	VERTICAL Peak
3	7454.429	32.95	36.32	6.23	36.77	38.73	54.00	-15.27	VERTICAL Average
4	7454.429	43.40	36.32	6.23	36.77	49.18	74.00	-24.82	VERTICAL Peak
5	8271.880	30.06	37.01	6.46	36.76	36.77	54.00	-17.23	VERTICAL Average
6	8271.880	43.20	37.01	6.46	36.76	49.91	74.00	-24.09	VERTICAL Peak
7	9126.063	32.08	37.59	7.46	36.46	40.67	54.00	-13.33	VERTICAL Average
8	9126.063	42.57	37.59	7.46	36.46	51.16	74.00	-22.84	VERTICAL Peak
9	11454.200	30.43	39.91	8.37	36.38	42.33	54.00	-11.67	VERTICAL Average
10	11454.200	39.03	39.91	8.37	36.38	50.93	74.00	-23.07	VERTICAL Peak
11	15759.050	39.04	38.70	9.86	36.38	51.22	74.00	-22.78	VERTICAL Peak
12	15759.050	26.11	38.70	9.86	36.38	38.29	54.00	-15.71	VERTICAL Average



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Mode:h; Polarization:Horizontal; GFSK; Channel:middle



Trace: (Discrete)

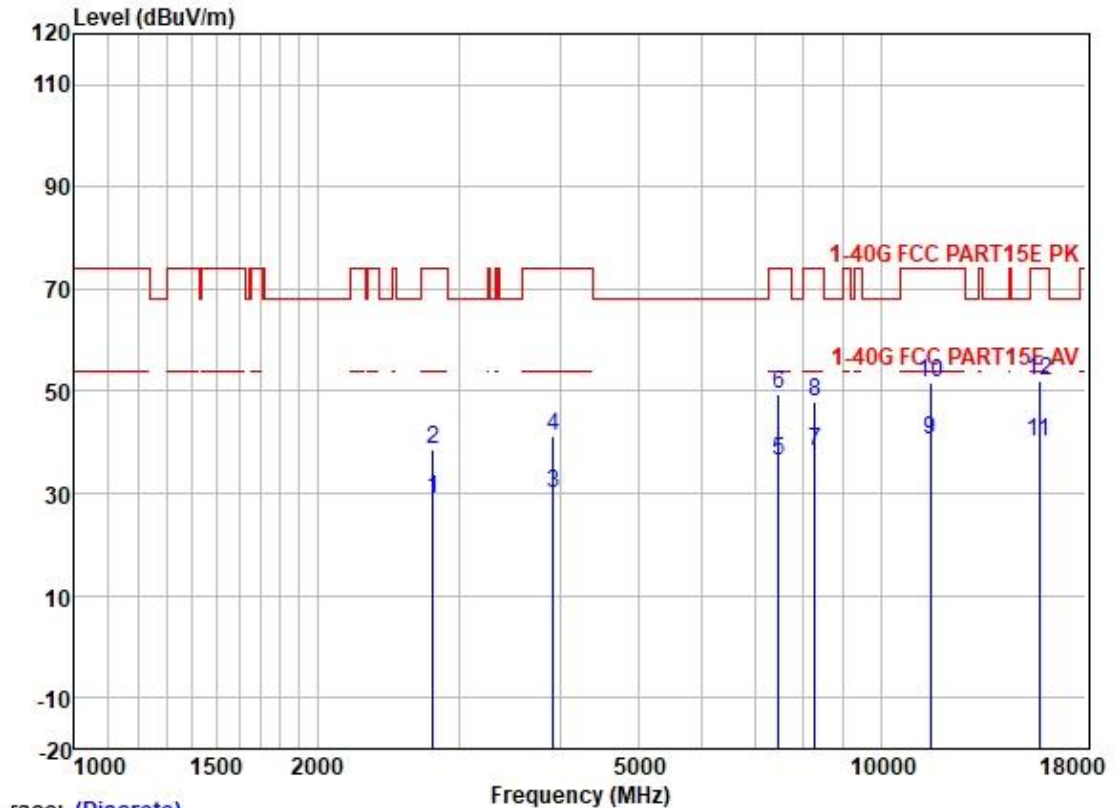
	Read	Antenna	Cable	Preamp	Level	Limit	Over		
	Freq	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dB		
1	2814.411	33.59	28.17	3.70	36.71	28.75	54.00	-25.25	HORIZONTAL Average
2	2814.411	43.24	28.17	3.70	36.71	38.40	74.00	-35.60	HORIZONTAL Peak
3	3958.309	32.82	29.75	4.60	36.40	30.77	54.00	-23.23	HORIZONTAL Average
4	3958.309	42.90	29.75	4.60	36.40	40.85	74.00	-33.15	HORIZONTAL Peak
5	7562.942	32.32	36.45	6.25	36.78	38.24	54.00	-15.76	HORIZONTAL Average
6	7562.942	42.78	36.45	6.25	36.78	48.70	74.00	-25.30	HORIZONTAL Peak
7	8271.880	34.03	37.01	6.46	36.76	40.74	54.00	-13.26	HORIZONTAL Average
8	8271.880	42.87	37.01	6.46	36.76	49.58	74.00	-24.42	HORIZONTAL Peak
9	11520.200	30.15	39.84	8.40	36.38	42.01	54.00	-11.99	HORIZONTAL Average
10	11520.200	39.61	39.84	8.40	36.38	51.47	74.00	-22.53	HORIZONTAL Peak
11	15804.660	29.78	38.61	9.86	36.40	41.85	54.00	-12.15	HORIZONTAL Average
12	15804.660	39.83	38.61	9.86	36.40	51.90	74.00	-22.10	HORIZONTAL Peak



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Mode:h; Polarization:Vertical; GFSK; Channel:middle



Trace: (Discrete)

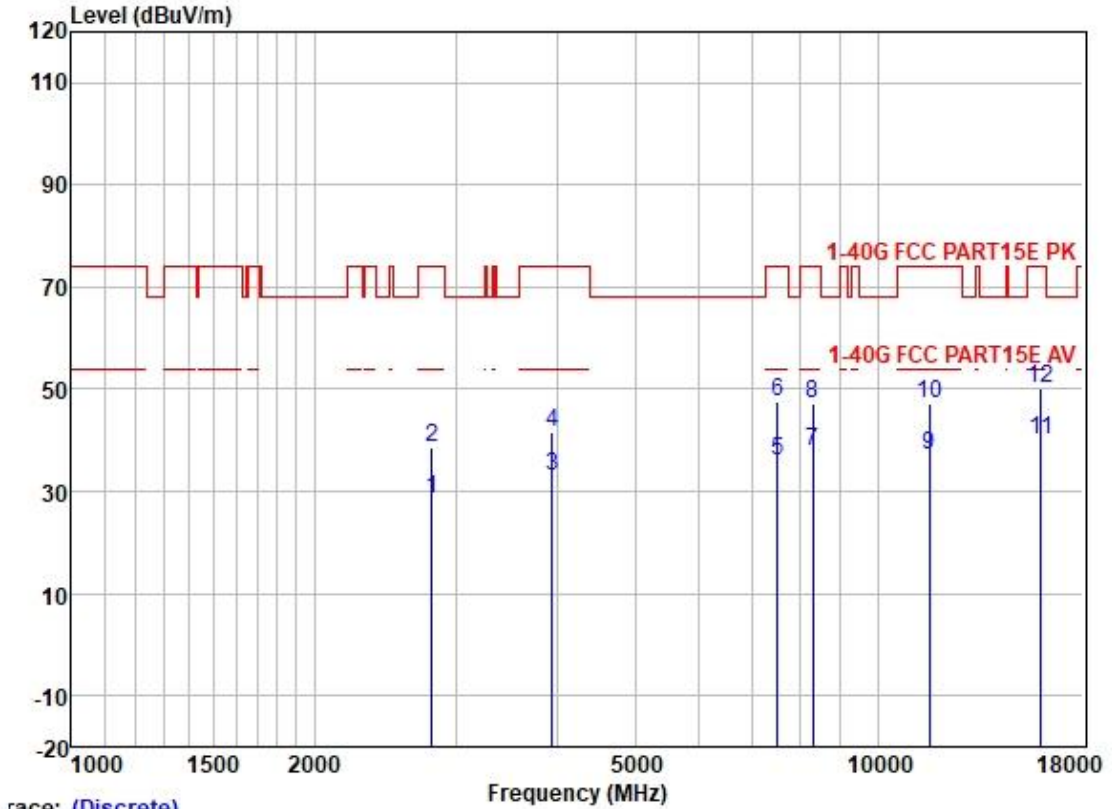
	Read Freq	Antenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2782.060	33.79	28.10	3.69	36.75	28.83	54.00	-25.17	VERTICAL	Average
2	2782.060	43.48	28.10	3.69	36.75	38.52	74.00	-35.48	VERTICAL	Peak
3	3924.135	32.16	29.72	4.60	36.41	30.07	54.00	-23.93	VERTICAL	Average
4	3924.135	43.22	29.72	4.60	36.41	41.13	74.00	-32.87	VERTICAL	Peak
5	7476.006	30.57	36.36	6.25	36.77	36.41	54.00	-17.59	VERTICAL	Average
6	7476.006	43.75	36.36	6.25	36.77	49.59	74.00	-24.41	VERTICAL	Peak
7	8295.823	31.47	37.02	6.50	36.75	38.24	54.00	-15.76	VERTICAL	Average
8	8295.823	41.08	37.02	6.50	36.75	47.85	74.00	-26.15	VERTICAL	Peak
9	11520.300	28.78	39.84	8.40	36.38	40.64	54.00	-13.36	VERTICAL	Average
10	11520.300	39.86	39.84	8.40	36.38	51.72	74.00	-22.28	VERTICAL	Peak
11	15713.560	27.70	38.78	9.87	36.35	40.00	54.00	-14.00	VERTICAL	Average
12	15713.560	39.61	38.78	9.87	36.35	51.91	74.00	-22.09	VERTICAL	Peak



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Mode:h; Polarization:Horizontal; GFSK; Channel:High



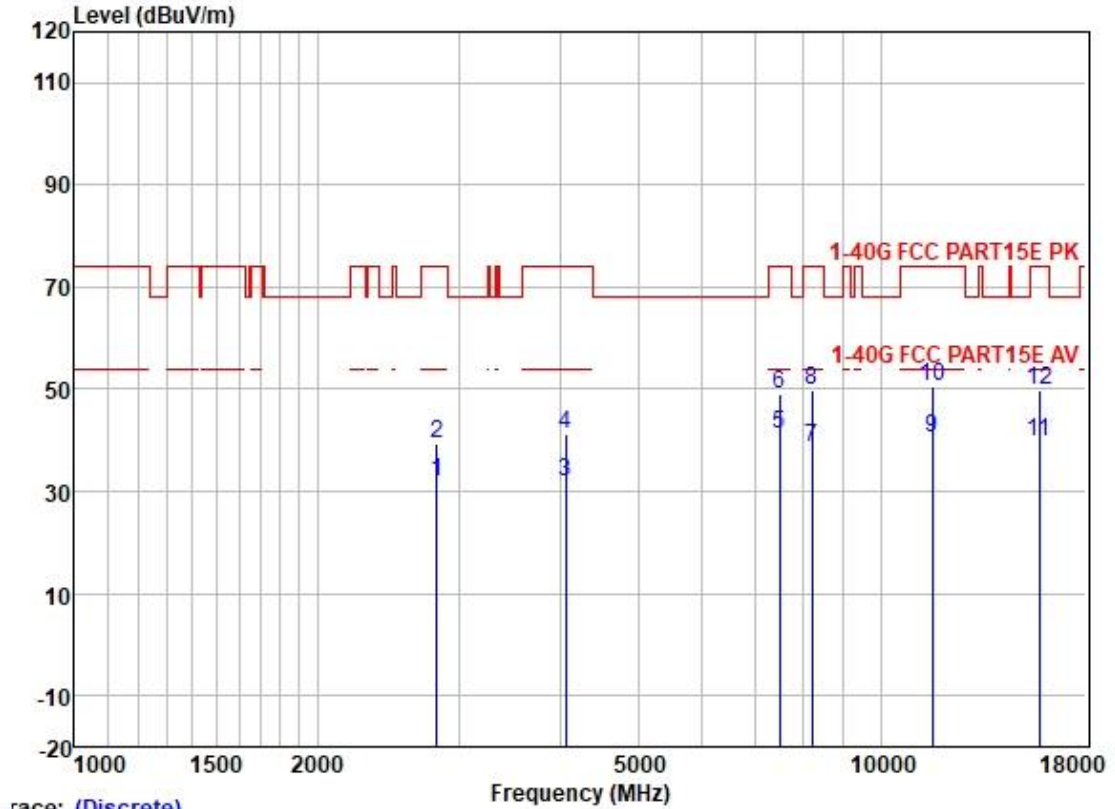
Trace: (Discrete)

	ReadAntenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Pol/Phase	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	2798.189	33.26	28.13	3.70	36.73	28.36	54.00	-25.64	HORIZONTAL Average
2	2798.189	43.64	28.13	3.70	36.73	38.74	74.00	-35.26	HORIZONTAL Peak
3	3946.885	35.00	29.74	4.60	36.40	32.94	54.00	-21.06	HORIZONTAL Average
4	3946.885	43.82	29.74	4.60	36.40	41.76	74.00	-32.24	HORIZONTAL Peak
5	7519.349	29.97	36.42	6.26	36.77	35.88	54.00	-18.12	HORIZONTAL Average
6	7519.349	41.50	36.42	6.26	36.77	47.41	74.00	-26.59	HORIZONTAL Peak
7	8319.836	30.87	37.03	6.53	36.75	37.68	54.00	-16.32	HORIZONTAL Average
8	8319.836	40.48	37.03	6.53	36.75	47.29	74.00	-26.71	HORIZONTAL Peak
9	11600.020	25.39	39.72	8.37	36.39	37.09	54.00	-16.91	HORIZONTAL Average
10	11600.020	35.56	39.72	8.37	36.39	47.26	74.00	-26.74	HORIZONTAL Peak
11	15942.300	28.46	38.37	9.85	36.48	40.20	54.00	-13.80	HORIZONTAL Average
12	15942.300	38.53	38.37	9.85	36.48	50.27	74.00	-23.73	HORIZONTAL Peak



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Mode:h; Polarization:Vertical; GFSK; Channel:High



Trace: (Discrete)

	Read	Antenna	Cable	Preamplifier	Level	Limit	Over		
	Freq	Level	Factor	Loss	Factor	Line	Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2814.411	36.76	28.17	3.70	36.71	31.92	54.00	-22.08	VERTICAL Average
2	2814.411	44.21	28.17	3.70	36.71	39.37	74.00	-34.63	VERTICAL Peak
3	4062.629	33.63	29.88	4.60	36.40	31.71	54.00	-22.29	VERTICAL Average
4	4062.629	43.03	29.88	4.60	36.40	41.11	74.00	-32.89	VERTICAL Peak
5	7497.646	35.26	36.40	6.26	36.77	41.15	54.00	-12.85	VERTICAL Average
6	7497.646	43.16	36.40	6.26	36.77	49.05	74.00	-24.95	VERTICAL Peak
7	8224.200	32.02	36.99	6.39	36.76	38.64	54.00	-15.36	VERTICAL Average
8	8224.200	43.25	36.99	6.39	36.76	49.87	74.00	-24.13	VERTICAL Peak
9	11600.900	28.87	39.72	8.37	36.39	40.57	54.00	-13.43	VERTICAL Average
10	11600.900	38.82	39.72	8.37	36.39	50.52	74.00	-23.48	VERTICAL Peak
11	15713.560	27.48	38.78	9.87	36.35	39.78	54.00	-14.22	VERTICAL Average
12	15713.560	37.60	38.78	9.87	36.35	49.90	74.00	-24.10	VERTICAL Peak



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**7.8 Radiated Emissions which around the fundamental frequency**

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.407(b)

Test Method: KDB 789033 D02 II G

Measurement Distance: 3m

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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**7.8.1 E.U.T. Operation**

Operating Environment:

Temperature: 23 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Pretest these modes to find the worst case: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

i:Charge + TX mode (Band 3)\_Keep the EUT in charging and continuously transmitting mode with GFSK modulation type.

The worst case for final test: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

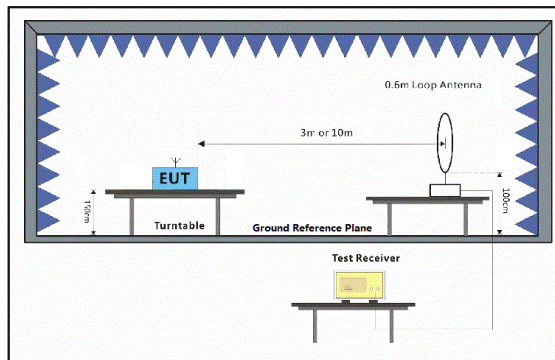
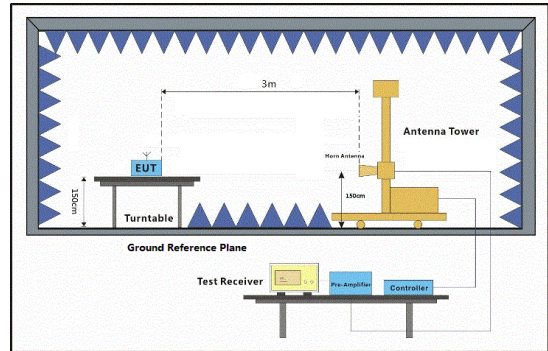
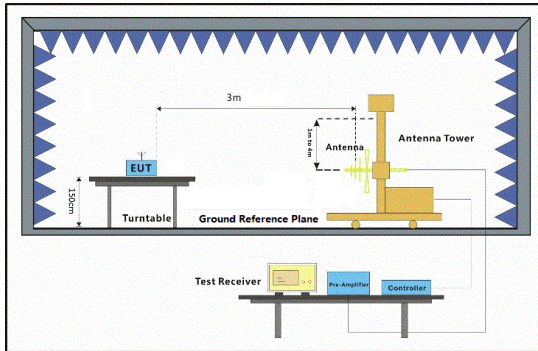


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### 7.8.2 Test Setup Diagram



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**7.8.3 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.

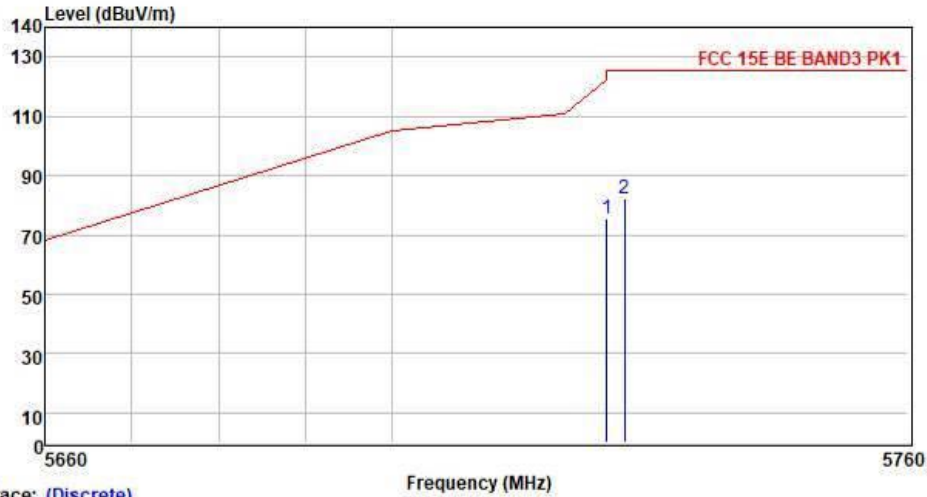
Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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Mode:h; Polarization:Horizontal; GFSK; Channel:Low



Trace: (Discrete)  
 Site : SGS  
 Condition: FCC 15E BE BAND3 PK1  
 Test Mode: TX-5727  
 Product :  
 Model : RETEST-2  
 Remark : Level=Read Level + Cable loss  
 : + Antenna Factor - Preamp factor

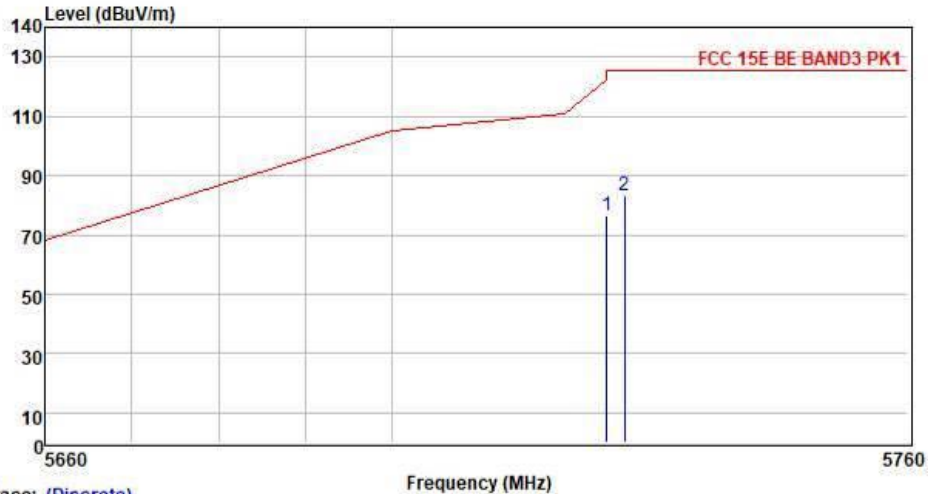
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5725.00	72.96	32.07	6.99	36.59	75.43	122.20	-46.77	HORIZONTAL	Peak
2	5727.00	79.56	32.07	6.99	36.59	82.03	125.20	-43.17	HORIZONTAL	Peak



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Mode:h; Polarization:Vertical; GFSK; Channel:Low



Trace: (Discrete)  
 Site : SGS  
 Condition: FCC 15E BE BAND3 PK1  
 Test Mode: TX-5727  
 Product :  
 Model : RETEST-2  
 Remark : Level=Read Level + Cable loss  
 : + Antenna Factor - Preamp factor

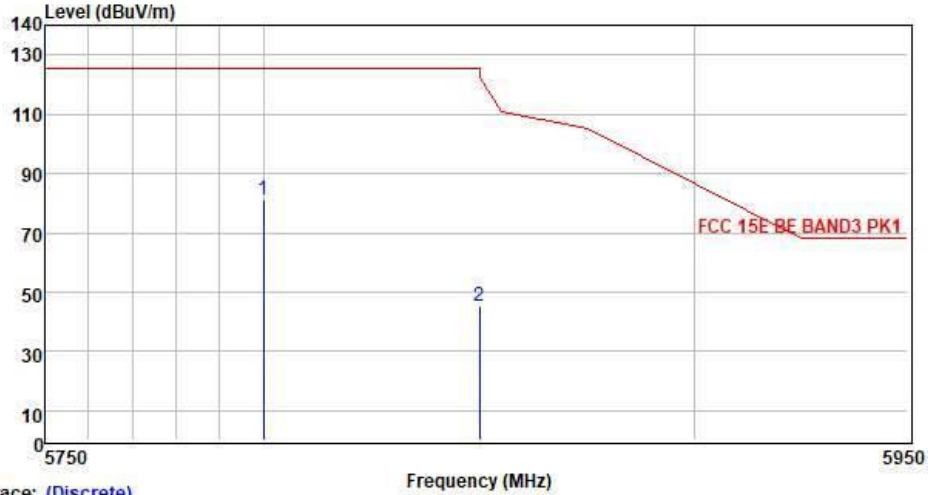
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5725.00	74.14	32.07	6.99	36.59	76.61	122.20	-45.59	VERTICAL	Peak
2	5727.00	80.63	32.07	6.99	36.59	83.10	125.20	-42.10	VERTICAL	Peak



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Mode:h; Polarization:Horizontal; GFSK; Channel:High



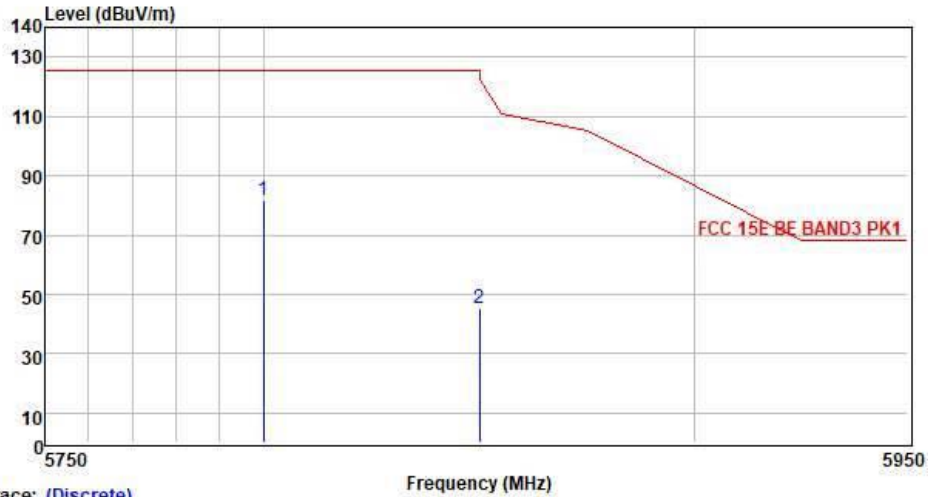
Trace: (Discrete)  
 Site : SGS  
 Condition: FCC 15E BE BAND3 PK1  
 Test Mode: TX-5800  
 Product :  
 Model : RETEST-2  
 Remark : Level=Read Level + Cable loss  
 : + Antenna Factor - Preamp factor

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5800.00	78.30	32.19	7.47	36.59	81.37	125.20	-43.83	HORIZONTAL	Peak
2	5850.00	42.14	32.25	7.44	36.59	45.24	122.20	-76.96	HORIZONTAL	Peak



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Mode:h; Polarization:Vertical; GFSK; Channel:High



Trace: (Discrete)  
 Site : SGS  
 Condition: FCC 15E BE BAND3 PK1  
 Test Mode: TX-5800  
 Product :  
 Model : RETEST-2  
 Remark : Level=Read Level + Cable loss  
 : + Antenna Factor - Preamp factor

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5800.00	78.55	32.19	7.47	36.59	81.62	125.20	-43.58	VERTICAL	Peak
2	5850.00	42.16	32.25	7.44	36.59	45.26	122.20	-76.94	VERTICAL	Peak



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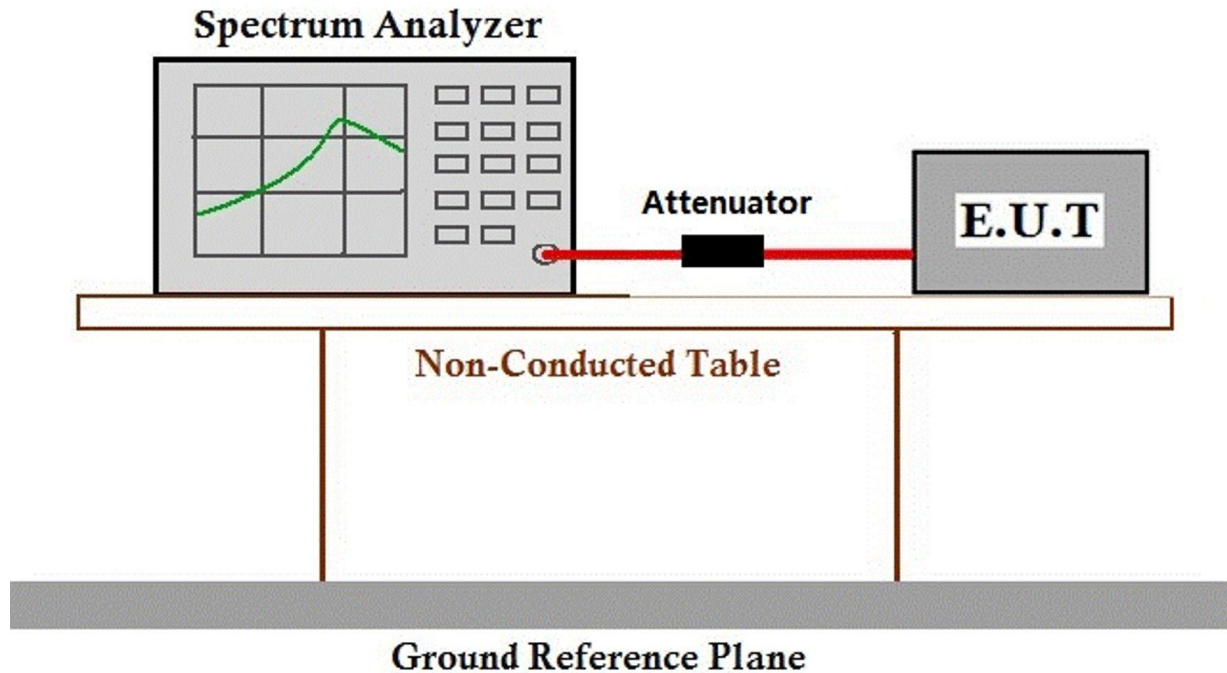
## 7.9 Frequency Stability

Test Requirement: 47 CFR Part 15, Subpart C 15.407 (g)  
 Test Method: ANSI C63.10 (2013) Section 6.8  
 Limit: The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

### 7.9.1 E.U.T. Operation

Operating Environment:  
 Temperature: 23.5 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar  
 Test Mode: h:TX mode (Band 3)\_Keep the EUT in continuously transmitting mode with GFSK modulation type.

### 7.9.2 Test Setup Diagram



### 7.9.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.407



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## 8 Photographs

### 8.1 Conducted Emissions at AC Power Line (150kHz-30MHz) Test Setup



### 8.2 Radiated Emissions Test Setup



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### 8.3 Radiated Emissions which fall in the restricted bands Test Setup



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### 8.4 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for GZEM2009015373CR.



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## 9 Appendix

### 9.1 Appendix 15.407

### 9.2 Appendix A1: 26dB Emission Bandwidth

#### 9.2.1 Test Result

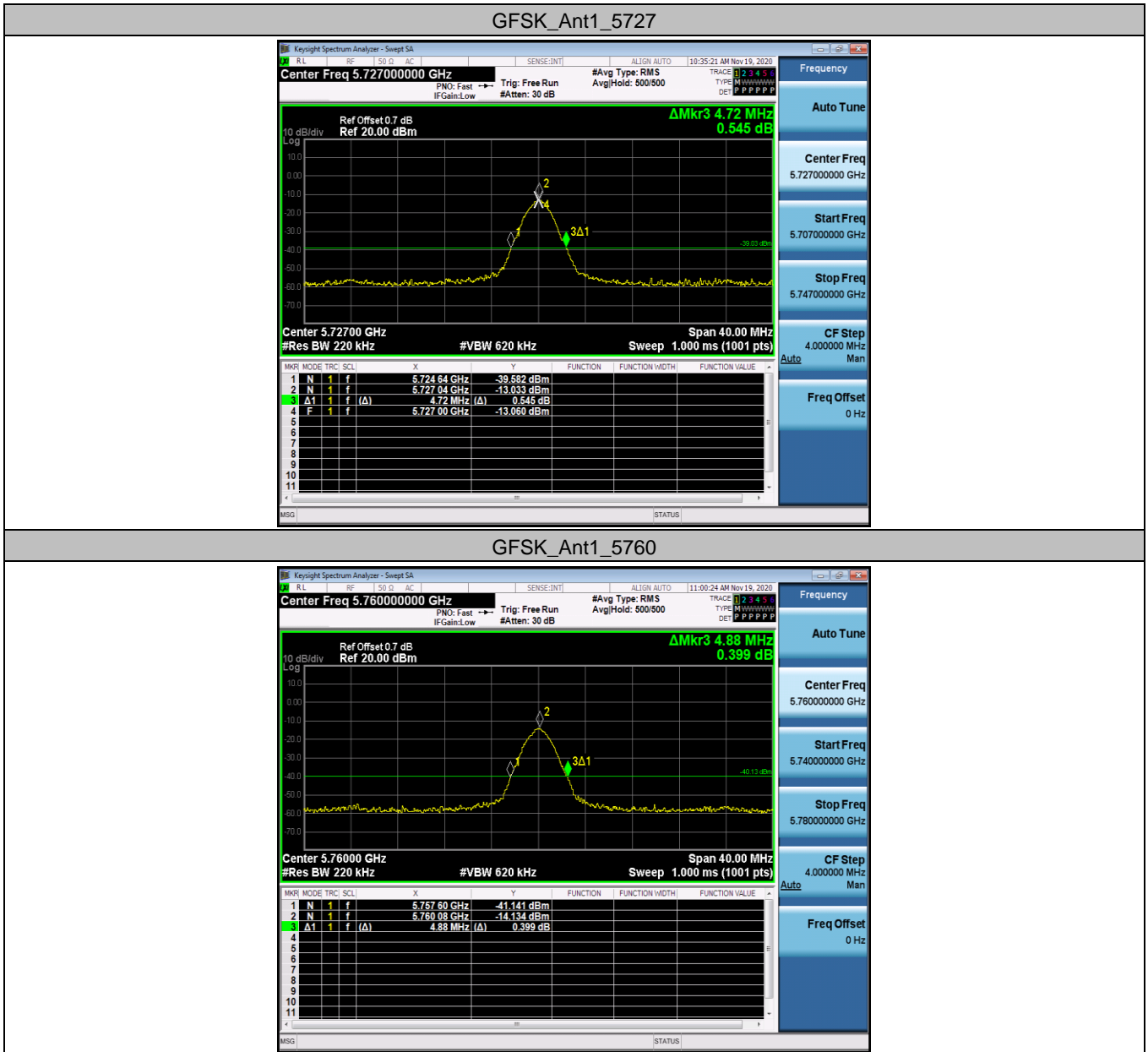
Test Mode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
GFSK	Ant1	5727	4.720	5724.640	5729.360	---	PASS
		5760	4.880	5757.600	5762.480	---	PASS
		5800	4.920	5797.560	5802.480	---	PASS



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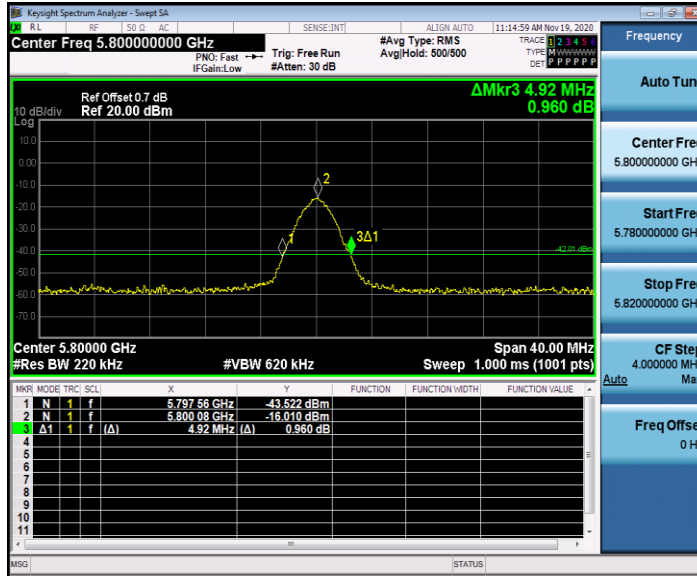
### 9.2.2 Test Graphs



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### 9.3 Appendix A2: Occupied channel bandwidth

#### 9.3.1 Test Result

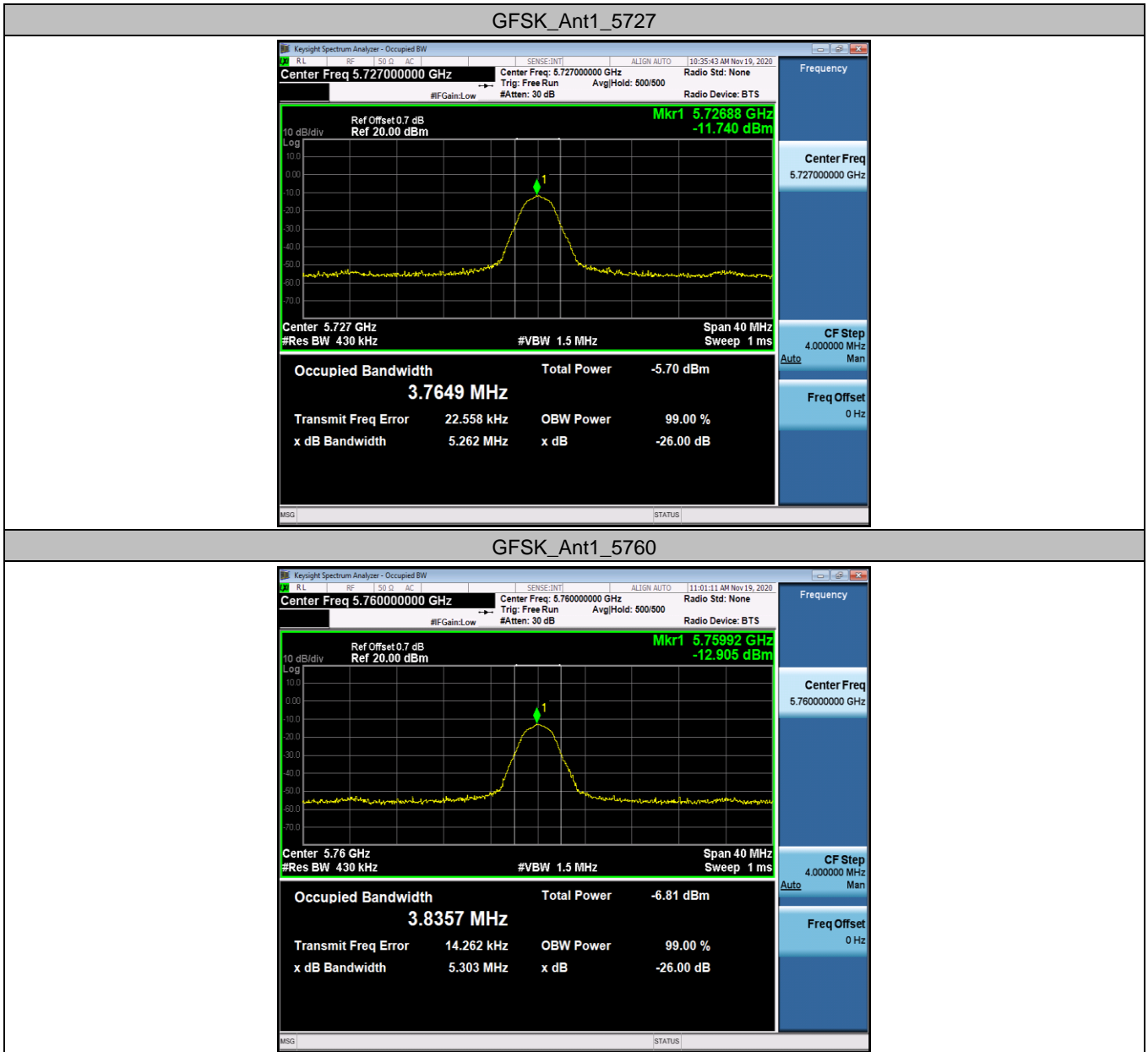
Test Mode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
GFSK	Ant1	5727	3.7649	5725.140	5728.905	---	PASS
		5760	3.8357	5758.096	5761.932	---	PASS
		5800	3.9300	5798.038	5801.968	---	PASS



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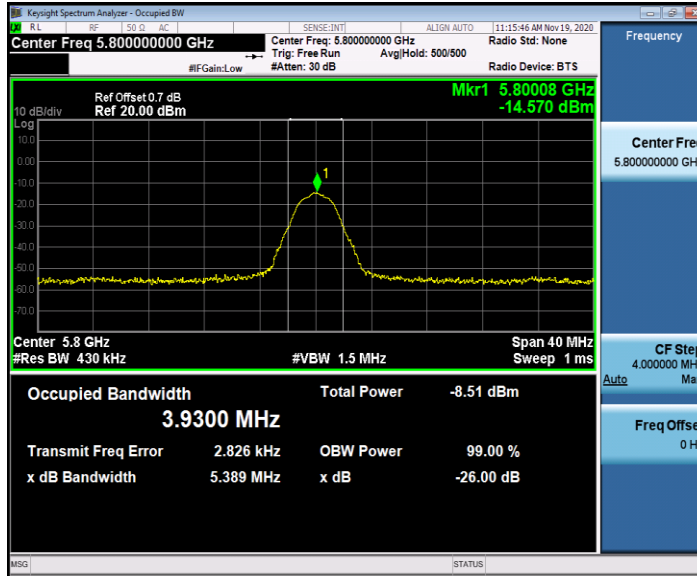
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### 9.3.2 Test Graphs



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**9.4 Appendix A3: Min 6dB emission bandwidth**

**9.4.1 Test Result**

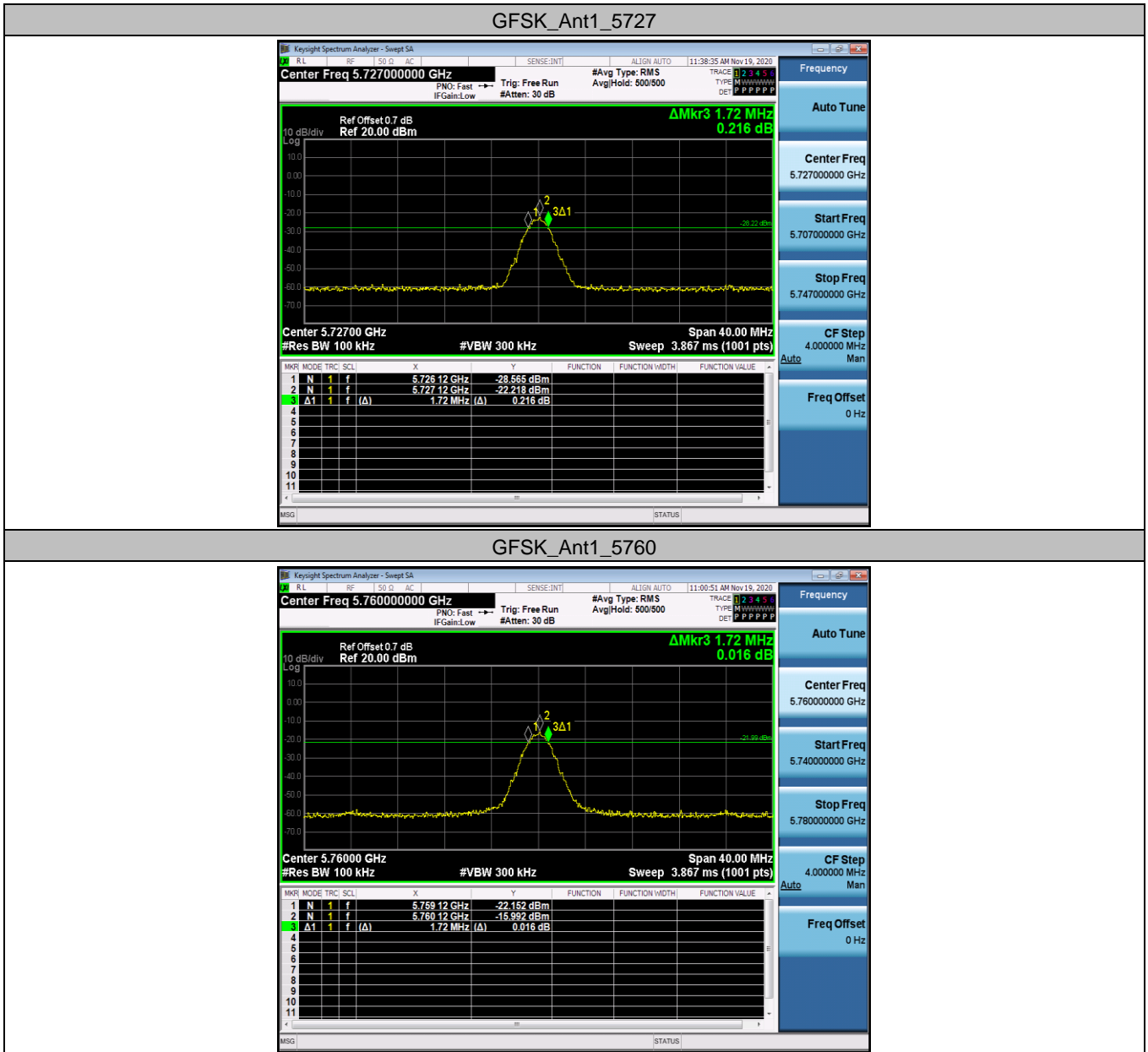
Test Mode	Antenna	Channel	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
GFSK	Ant1	5727	1.720	5726.120	5727.840	0.5	PASS
		5760	1.720	5759.120	5760.840	0.5	PASS
		5800	1.880	5799.080	5800.960	0.5	PASS



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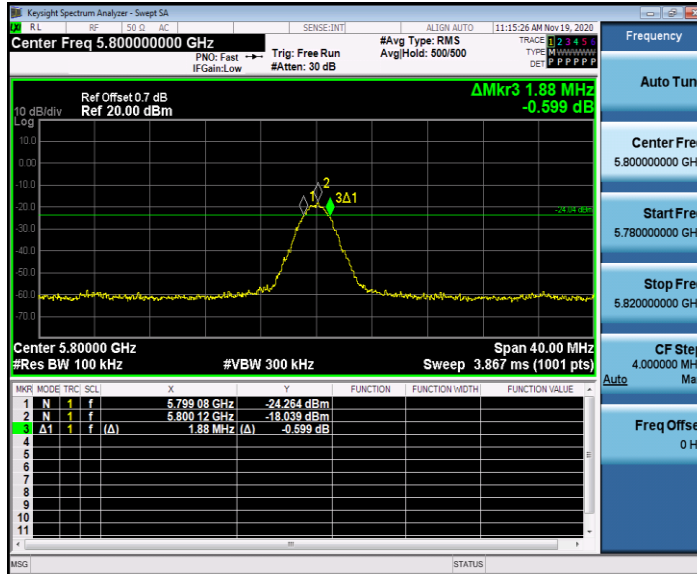
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### 9.4.2 Test Graphs



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**9.5 Appendix B: Maximum conducted output power**

**9.5.1 Test Result**

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
GFSK	Ant1	5727	-11.80	<=30	PASS
		5760	-13.11	<=30	PASS
		5800	-14.54	<=30	PASS

Note: The Duty Cycle Factor is compensated in the graph.



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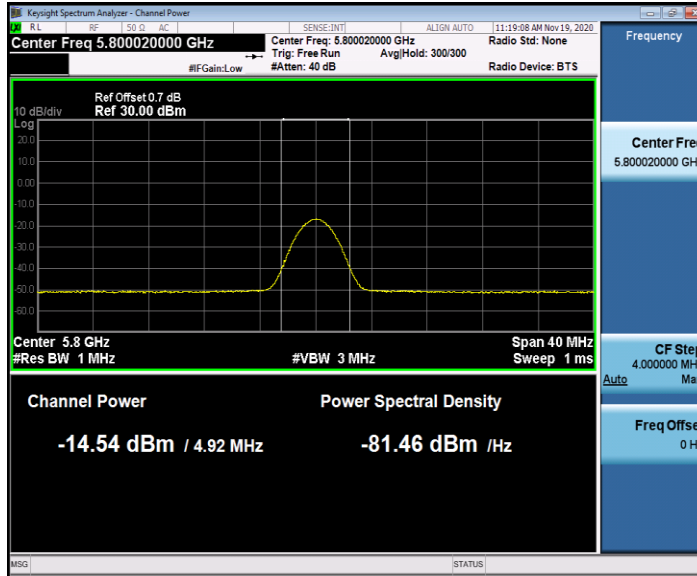
### 9.5.2 Test Graphs



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**9.6 Appendix C: Maximum power spectral density**

**9.6.1 Test Result**

Test Mode	Antenna	Channel	Result [dBm/300KHz]	RBW factor[dBm]	Result [dBm/500KHz]	Limit[dBm/500KHz]	Verdict
GFSK	Ant1	5727	-12.96	2.218	-10.742	<=30	PASS
		5760	-14.35	2.218	-12.132	<=30	PASS
		5800	-15.43	2.218	-13.212	<=30	PASS

Note:

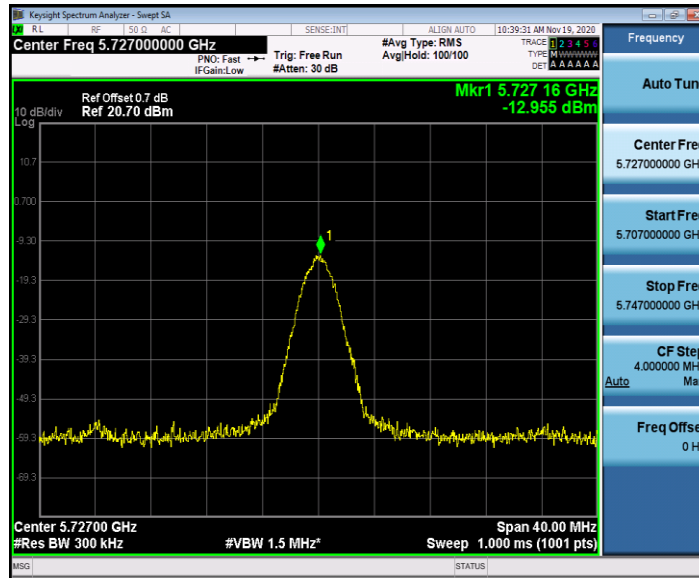
- The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz. If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyser set during measurement.  
 The test RBW is 300KHz, the RBW correct factor is 10log(500KHz/300KHz) =2.218dB.
- The Duty Cycle Factor 0dB is compensated in the graph.



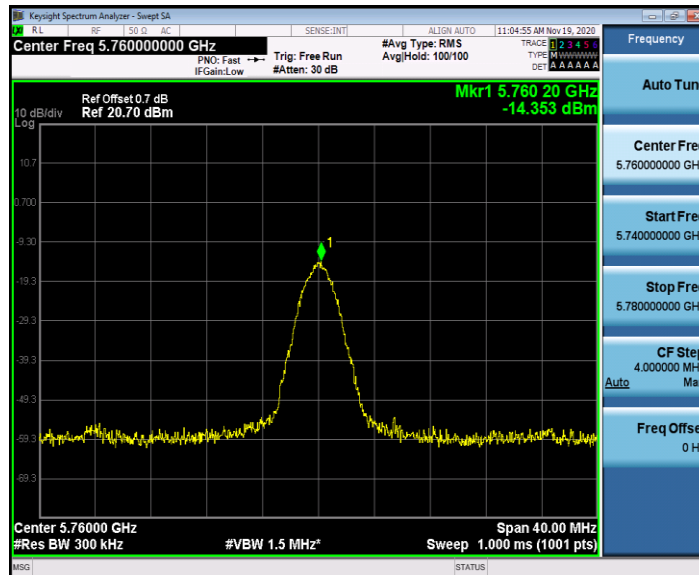
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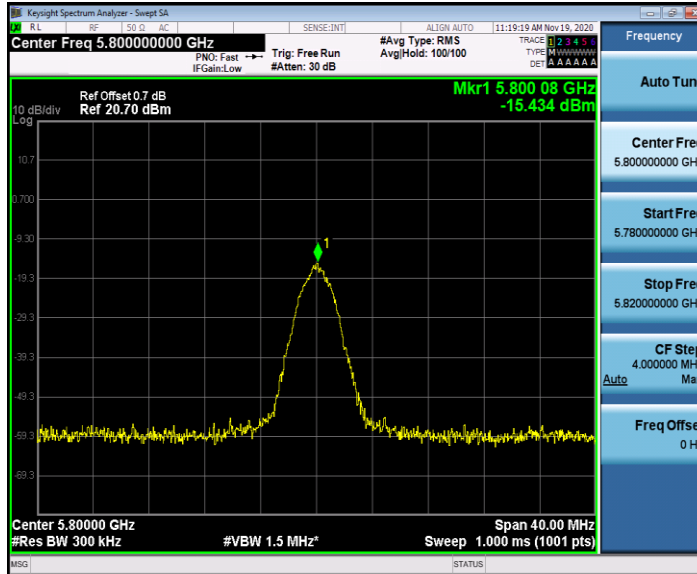


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**9.7 Appendix D: Band edge measurements**

**9.7.1 Test Result**

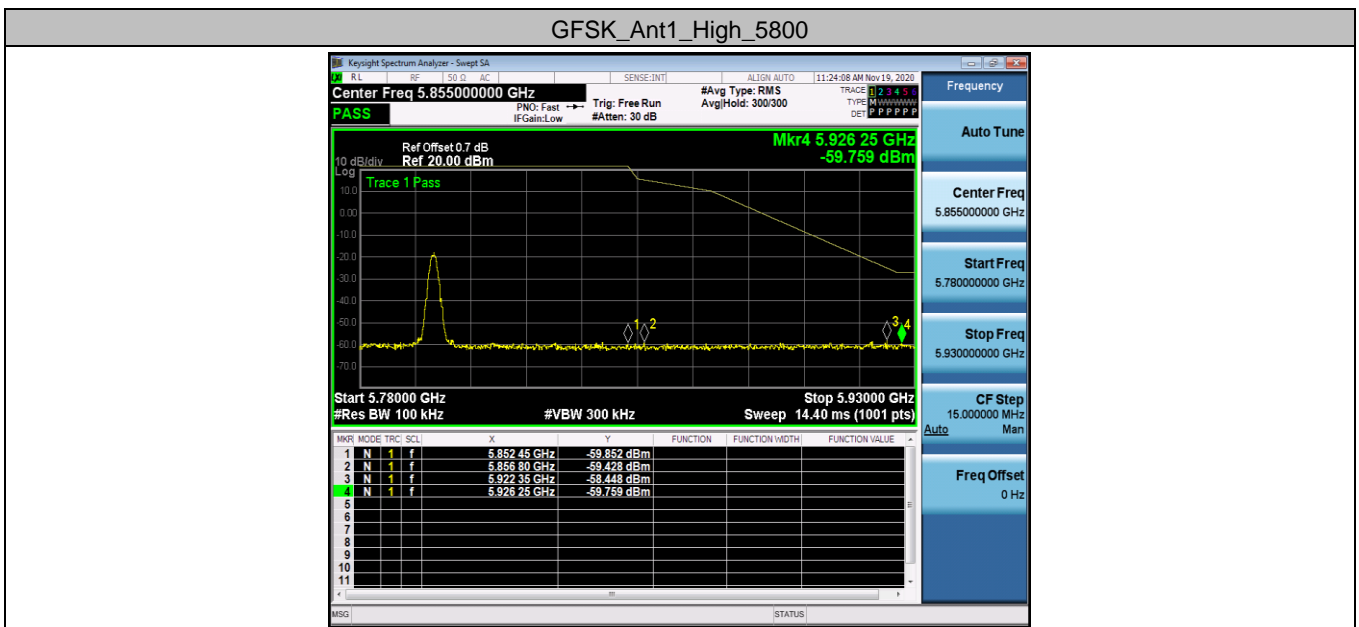
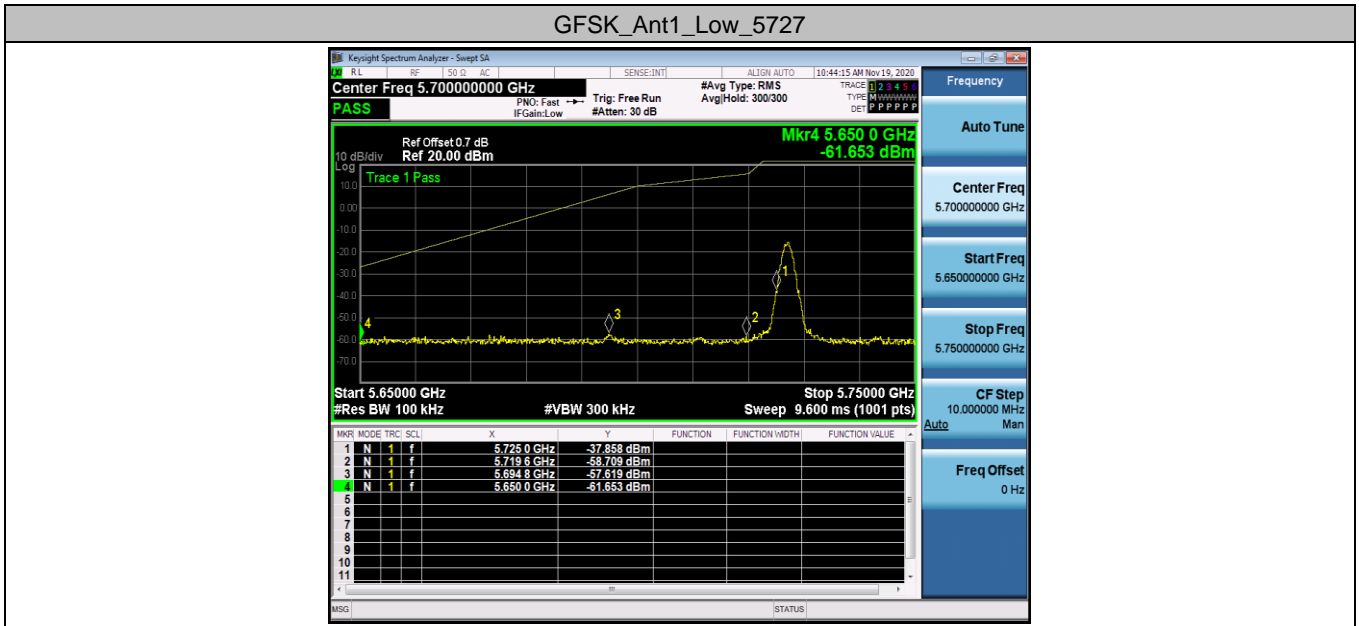
Test Mode	Antenna	Ch Name	Channel	Freq Range [MHz]	Freq [MHz]	Result [dBm]	Limit [dBm]	Verdict
GFSK	Ant1	Low	5727	5650~5700	5694.8	-57.62	<=6.15	PASS
				5700~5720	5719.6	-58.71	<=15.49	PASS
				5720~5725	5725.0	-37.86	<=27.00	PASS
				5750~5650	5650.0	-61.65	<=-27	PASS
		High	5800	5850~5855	5852.4	-59.85	<=21.19	PASS
				5855~5875	5856.8	-59.43	<=10.50	PASS
				5875~5925	5922.3	-58.45	<=8.04	PASS
				5925~5930	5926.2	-59.76	<=-27	PASS



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### 9.7.2 Test Graphs



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## 9.8 Appendix E: Frequency Stability

### 9.8.1 Test Result

Voltage vs Frequency							
Test Mode	Antenna	Channel	Voltage [Vdc]	Temperature (°C)	Measured frequency	Limit MHz	Verdict
GFSK	Ant1	5727	NV	NT	5727.121	5725 to 5850	PASS
			LV	NT	5727.122	5725 to 5850	PASS
			HV	NT	5727.123	5725 to 5850	PASS
		5760	NV	NT	5760.121	5725 to 5850	PASS
			LV	NT	5760.121	5725 to 5850	PASS
			HV	NT	5760.121	5725 to 5850	PASS
		5800	NV	NT	5800.123	5725 to 5850	PASS
			LV	NT	5800.122	5725 to 5850	PASS
			HV	NT	5800.122	5725 to 5850	PASS

Frequency VS voltage:

85% and 115% of the nominal supply voltage

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 °C to +25 °C),

NV: Normal voltage, 14.8V DC.

LV: Low voltage, 85% of the nominal supply voltage, 12.58V

HV: High voltage, 110% of the nominal supply voltage, 16.28V

NT: Normal temperature, 20°C.



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Temperature VS frequency							
Test Mode	Antenna	Channel	Voltage [Vdc]	Temperature (°C)	Measured frequency	Limit MHz	Verdict
GFSK	Ant1	5727	NV	-30	5727.123	5725 to 5850	PASS
			NV	-20	5727.131	5725 to 5850	PASS
			NV	-10	5727.121	5725 to 5850	PASS
			NV	0	5727.122	5725 to 5850	PASS
			NV	10	5727.120	5725 to 5850	PASS
			NV	20	5727.111	5725 to 5850	PASS
			NV	30	5727.123	5725 to 5850	PASS
			NV	40	5727.121	5725 to 5850	PASS
			NV	50	5727.212	5725 to 5850	PASS
		5760	NV	-30	5760.121	5725 to 5850	PASS
			NV	-20	5760.122	5725 to 5850	PASS
			NV	-10	5760.122	5725 to 5850	PASS
			NV	0	5760.121	5725 to 5850	PASS
			NV	10	5760.123	5725 to 5850	PASS
			NV	20	5760.122	5725 to 5850	PASS
			NV	30	5760.122	5725 to 5850	PASS
			NV	40	5760.123	5725 to 5850	PASS
			NV	50	5760.120	5725 to 5850	PASS
		5800	NV	-30	5800.122	5725 to 5850	PASS
			NV	-20	5800.112	5725 to 5850	PASS
			NV	-10	5800.102	5725 to 5850	PASS
			NV	0	5800.121	5725 to 5850	PASS
			NV	10	5800.120	5725 to 5850	PASS
			NV	20	5800.121	5725 to 5850	PASS
			NV	30	5800.123	5725 to 5850	PASS
			NV	40	5800.121	5725 to 5850	PASS
			NV	50	5800.123	5725 to 5850	PASS



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## 9.9 Appendix F: Duty Cycle

### 9.9.1 Test Result

Test Mode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
GFSK	Ant1	5727	100.00	100.00	100.00
		5760	100.00	100.00	100.00
		5800	100.00	100.00	100.00

--End of Report--



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