

TEST REPORT

Product Name : Digital Radio
Brand Name : BAOFENG, POFUNG, ALERVITES
Model/HVIN : DM-1905L
Series Model : N/A
FCC ID : 2AJGM-DM1905L
Applicant : **PO FUNG ELECTRONIC (HK) INTERNATIONAL GROUP
COMPANY LIMITED**
Address : Room 1508, 15/F, Office Tower II, Grand Plaza, 625 Nathan
Road, Kowloon, Hong Kong
Manufacturer : **PO FUNG ELECTRONIC (HK) INTERNATIONAL GROUP
COMPANY LIMITED**
Address : Room 1508, 15/F, Office Tower II, Grand Plaza, 625 Nathan
Road, Kowloon, Hong Kong
Standard(s) : FCC CFR Title 47 Part 90
Date of Receipt : Mar. 20, 2026
Date of Test : Mar. 20, 2026~ Mar. 31, 2026
Issued Date : Apr. 01, 2026

Issued By: **Dongguan Yaxu (AiT) Technology Limited**
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Reviewed by: Emiya Lin
Emiya Lin

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Simba Huang



Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Dongguan Yaxu (AiT) Technology Limited. If there is a need to alter or revise this document, the right belongs to Dongguan Yaxu (AiT) Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.

**Report Revise Record**

Report Version	Issued Date	Notes
M0	Apr. 01, 2026	Initial Release

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

[FCC Part 2:](#) FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

[FCC Rules Part 90:](#) PERSONAL RADIO SERVICES

[ANSI C63.26:2015:](#) American National Standard of procedures for compliance testing of transmitters used in licensed radio services.

1.2 Test Summary

Test specification clause	Test case	Verdict
FCC Part 90.205	Maximum Transmitter Power	PASS
FCC Part 90.207	Modulation Characteristic	PASS
FCC Part 90.209	Occupied Bandwidth	PASS
FCC Part 90.210	Emission Mask	PASS
FCC Part 90.210	Transmitter Radiated Spurious Emission	PASS
FCC Part 90.210	Spurious Emission On Antenna Port	PASS
FCC Part 90.213	Frequency Stability	PASS
FCC Part 90.214	Transmitter Frequency Behavior	PASS

1.3 Test Facility

Test Laboratory: Dongguan Yaxu (AiT) Technology Limited

No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan, Guangdong, China

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

CNAS-Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited 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) on April 18, 2022

FCC-Registration No.: 362653 Designation Number: CN1457

Dongguan Yaxu (AiT) Technology Limited 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.

IC-Registration No.: 6819A CAB identifier: CN0122

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

A2LA-Lab Cert. No.: 6317.01

Dongguan Yaxu (AiT) Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4"Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Dongguan Yaxu (AiT) Technology Limited's quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Yaxu (AiT) laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	9KHz~30MHz ± 1.20 dB	(1)
Radiated Emission	9KHz~30MHz ± 3.10 dB	(1)
Radiated Emission	30MHz~1GHz ± 3.75 dB	(1)
Radiated Emission	1GHz~18GHz ± 3.88 dB	(1)
Radiated Emission	18GHz-40GHz ± 3.88 dB	(1)
RF power, conducted	30MHz~6GHz ± 0.16 dB	(1)
RF power density, conducted	± 0.24 dB	(1)
Spurious emissions, conducted	± 0.21 dB	(1)
Temperature	$\pm 1^{\circ}\text{C}$	(1)
Humidity	$\pm 3\%$	(1)
DC and low frequency voltages	$\pm 1.5\%$	(1)
Time	$\pm 2\%$	(1)
Duty cycle	$\pm 2\%$	(1)
Bandwidth	$\pm 1.5 \times 10^{-6}$	(1)

The report uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

2 GENERAL INFORMATION

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	Digital Radio
Model/Type reference:	DM-1905L
Series models:	N/A
Power Ratings:	Input: DC 5V/1A DC 7.4V Rechargeable Li-ion battery
Adapter information:	Model: A318-050100W-US2 Input: 100-240V~ 50/60Hz 0.2A Max Output: 5.0V□1.0A
Hardware Version:	DM-1905 V03
Software Version:	DM-1905 V03
Sample(s) Status:	AiTDG-261020005-1(Normal sample) AiTDG-261020005-2(Engineer sample)
Support Data Rate:	9600bps
Frequency Range:	From 400MHz to 470MHz
Rate Power:	High Level:5W(36.99dBm) Low Level:2.5W(33.98dBm)
Modulation Type:	Analog Voice:FM Digital(Voice+Data): 4FSK
Channel Separation:	Analog Voice:12.5KHz Digital(Voice+Data): 12.5Kz
Antenna Type:	External antenna
Antennal Gain:	1.5dBi

Note:

1. The product exhibits identical digital modulation and working characteristics across both digitized voice and data operating modes. Therefore, only one set of test results for the digital modulation modes is provided in this test report.
2. This equipment is capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth. Specifically, the DMR transceiver operates with a 12.5 kHz channel bandwidth and utilizes a two-slot TDMA structure (one voice time slot and one data time slot), thereby satisfying the spectrum efficiency requirement of 4800 bps/6.25 kHz BW.

2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. As, test modes selected as below by the technical parameters of the EUT:

Test mode	Modulation		Channel Separation	Power level
	FM	4FSK	12.5KHz	
Mode 1	☒		☒	High
Mode 2	☒		☒	Low
Mode 3		☒	☒	High
Mode 4		☒	☒	Low

Test Frequency:

Modulation Type	Channel Separation	Channel	Test Frequency (MHz)
Analog/FM	12.5KHz	CH _L	400.025 MHz
		CH _M	435.000 MHz
		CH _H	469.975 MHz
Digital/4FSK	12.5KHz	CH _L	400.025 MHz
		CH _M	435.000 MHz
		CH _H	469.975 MHz

2.4 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Serial No.	Provided by	Other
/	/	/	/	/	/
/	/	/	/	/	/

2.5 Equipment List for the Test

RF Conducted measurement						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
☒ 1	Spectrum Analyzer	Agilent	N9020A	MY53421570	2025.09.23	2026.09.22
☐ 2	Power Sensor	Agilent	U2021XA	MY54110007	2025.09.23	2026.09.22
☐ 3	Signal Generator	Agilent	N5182A	MY50143009	2025.09.26	2026.09.25
☐ 4	Analog signal generator	Agilent	E8257	MY51554256	2025.09.23	2026.09.22
☒ 5	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2025.09.25	2026.09.24
☒ 6	RF Communications test set	HP	8920A	US35010135	2025.09.23	2026.09.22
☒ 7	Power divider	Xingbo	HXGF-G2A03	210730-1-3	2025.09.23	2026.09.22
☒ 8	10dB Attenuator	eastsheep	20W-SMA-JK-6G	21060301	2025.09.23	2026.09.22
☒ 9	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	2025.09.23	2026.09.22
☐ 10	RF Test box	TST	TSTPASS	21033016	2025.09.23	2026.09.22
☐ 11	RF Software	TST	TSTPASS	Version 2.0	N/A	N/A

Radiation Emission measurement						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
☒ 1	Spectrum Analyzer	R&S	FSV40	101470	2025.09.26	2026.09.25
☒ 2	EMI Measuring Receiver	R&S	ESPI	100773	2025.09.25	2026.09.24
☒ 3	Low Noise Pre Amplifier	HP	HP8447E	1937A01855	2025.09.25	2026.09.24

☒ 4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2025.09.25	2026.09.24
☒ 5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB-9160	9160-3206	2024.08.29	2026.08.28
☒ 6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB-9160	9160-3207	2024.08.29	2026.08.28
☒ 7	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	452	2024.08.29	2026.08.28
☒ 8	Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	453	2024.08.29	2026.08.28
☐ 9	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367	2023.09.12	2026.09.11
☐ 10	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170368	2023.09.12	2026.09.11
☒ 11	6dB Attenuator	JFW	50FPE-006	4360846-949-1	2025.09.23	2026.09.22
☒ 12	RF Communications test set	HP	8920A	US35010135	2025.09.23	2026.09.22
☒ 13	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A

Note: ☐ is not applicable in this Test Report. ☒ is applicable in this Test Report.

3 TEST CONDITIONS AND RESULTS

3.1 Maximum Transmitter Power

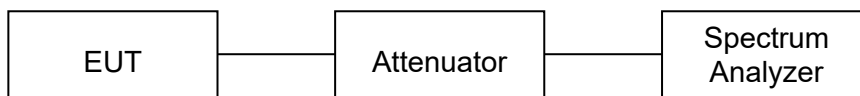
TEST APPLICABLE

Per FCC Part 2.1046 and Part 90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The output was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW.

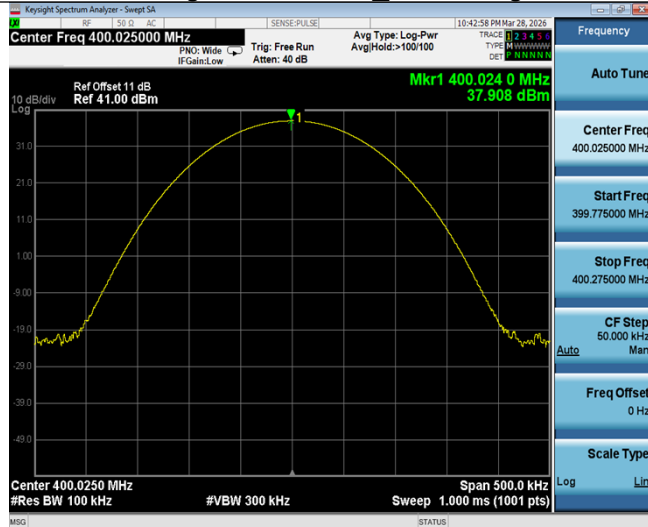
TEST CONFIGURATION



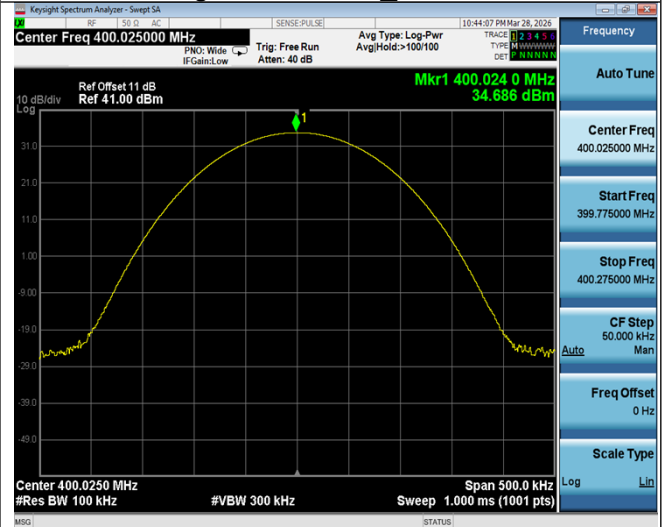
TEST RESULTS

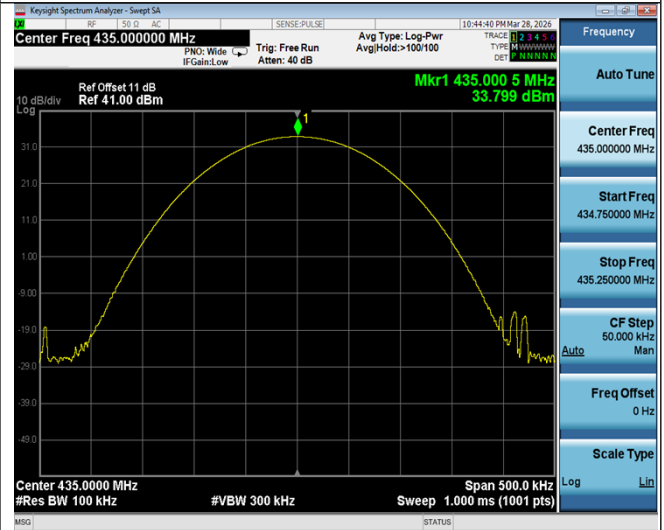
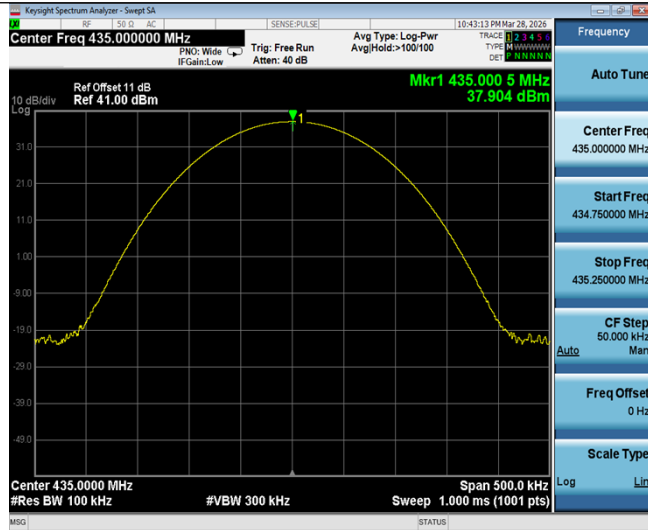
Modulation Type	Channel Separation (kHz)	Power level	Test channel	Output Power (dBm)	Output Power (W)	Test result
Analog/FM	12.5KHz	High	CH _L	37.908	6.18	Pass
			CH _M	37.904	6.17	Pass
			CH _H	37.012	5.03	Pass
		Low	CH _L	34.686	2.94	Pass
			CH _M	33.799	2.40	Pass
			CH _H	33.219	2.10	Pass
Digital/4FSK	12.5KHz	High	CH _L	37.970	6.27	Pass
			CH _M	37.912	6.18	Pass
			CH _H	37.011	5.02	Pass
		Low	CH _L	34.678	2.94	Pass
			CH _M	33.661	2.32	Pass
			CH _H	33.868	2.44	Pass

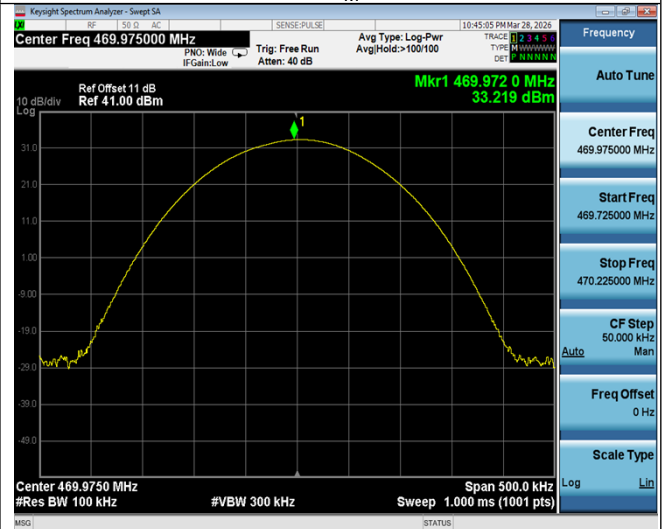
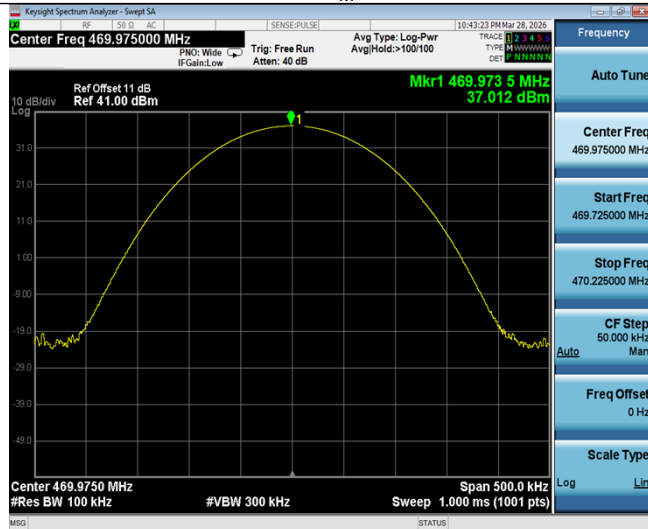
Analog/FM 12.5KHz_Power High



Analog/FM 12.5KHz_Power Low


CH_L

CH_L

CH_M

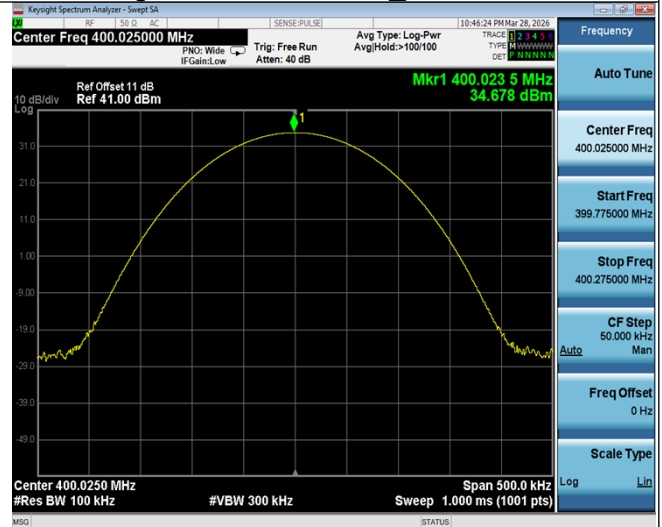
CH_M

CH_H

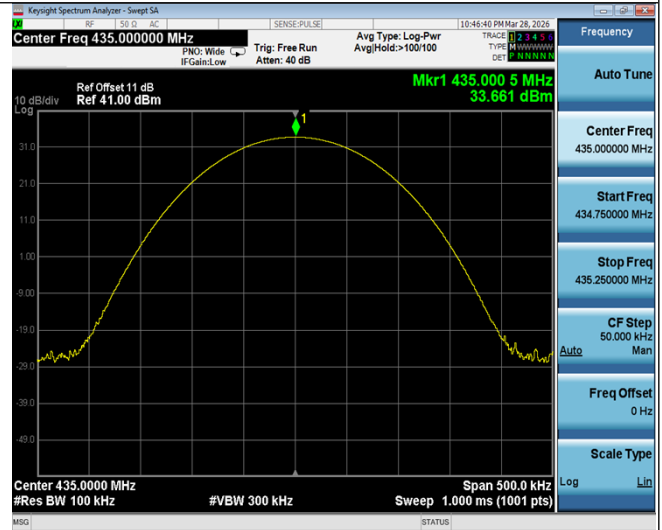
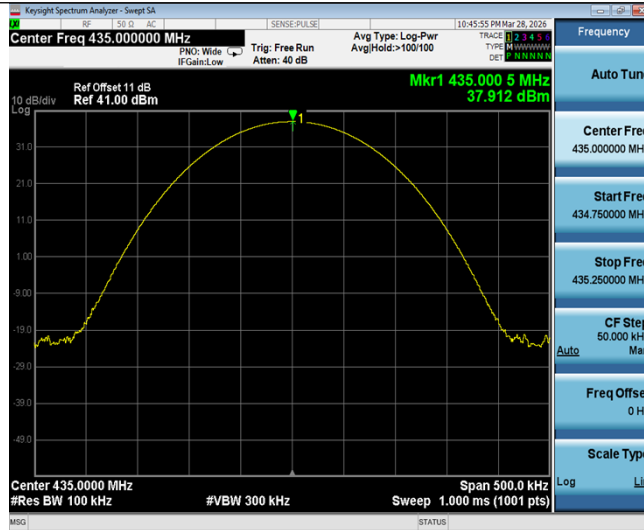
CH_H

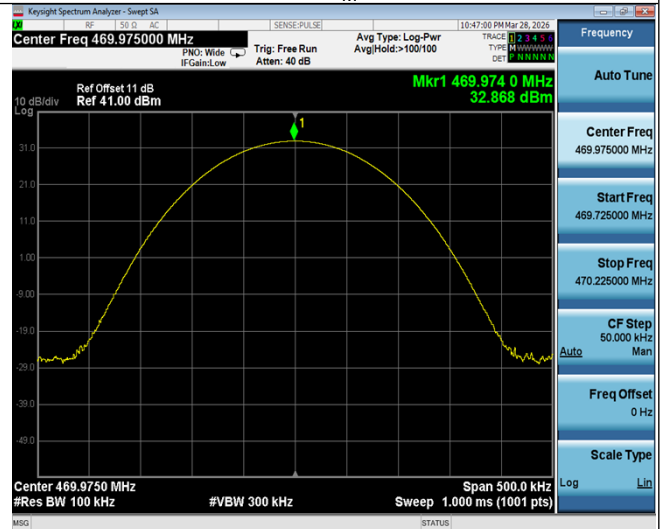
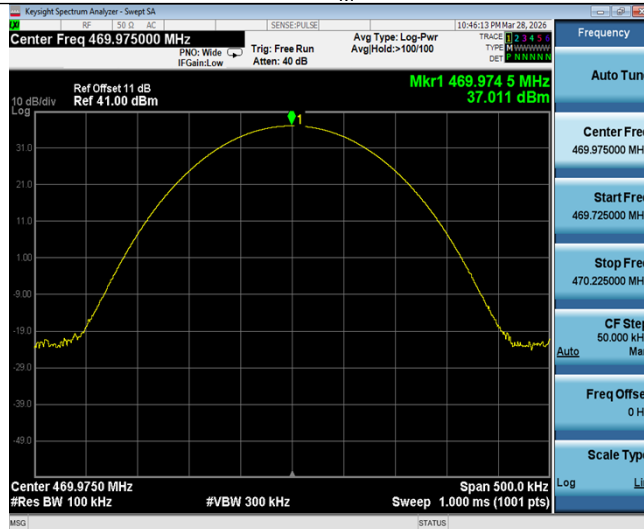
Digital/4FSK 12.5KHz Power High



Digital/4FSK 12.5KHz Power Low


CH_L

CH_L

CH_M

CH_M

CH_H

CH_H

3.2 Occupied Bandwidth and Emission Mask

TEST APPLICABLE

Occupied Bandwidth: FCC Part 90.209, FCC Part 2.1049

Frequency band (MHz)	Channel spacing (kHz)	Authorized bandwidth (kHz)
Below 25 ²		
25-50	20	20
72-76	20	20
150-174	¹ 7.5	^{1 3} 20/11.25/6
216-220 ⁵	6.25	20/11.25/6
220-222	5	4
406-512 ²	¹ 6.25	¹³⁶ 20/11.25/6
806-809/851-854	12.5	20
809-824/854-869	25	⁶ 20
896-901/935-940	12.5	13.6
902-928 ⁴		
929-930	25	20
1427-1432 ⁵	12.5	12.5
³ 2450-2483.5 ²		
Above 2500 ²		

Emission Mask: FCC Part 90.210, FCC Part 2.1049

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
Below 25 ¹	A or B	A or C
25-50	B	C
72-76	B	C
150-174 ²	B, D, or E	C, D or E
150 paging only	B	C
220-222	F	F
421-512 ^{2 5}	B, D, or E	C, D, or E
450 paging only	B	G
806-809/851-854 ⁶	B	H
809-824/854-869 ^{3 5}	B	G
896-901/935-940	I	J
902-928	K	K
929-930	B	G
4940-4990 MHz	L or M	L or M
5850-5925 ⁴		
All other bands	B	C

Emission Mask B:

For transmitters that are equipped with an audio low-pass filter pursuant to §90.211(a), the power of any emission must be below the unmodulated carrier power (P) as follows:

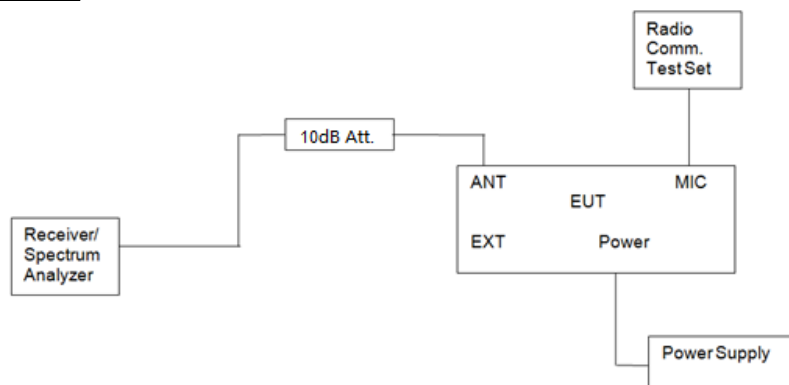
- (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
- (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
- (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

Emission Mask D 12.5 kHz channel bandwidth equipment:

For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- (1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 : Zero dB.
- (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88 \text{ kHz})$ dB.
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log (P)$ dB or 70 dB, whichever is the lesser attenuation.

TEST CONFIGURATION



TEST PROCEDURE

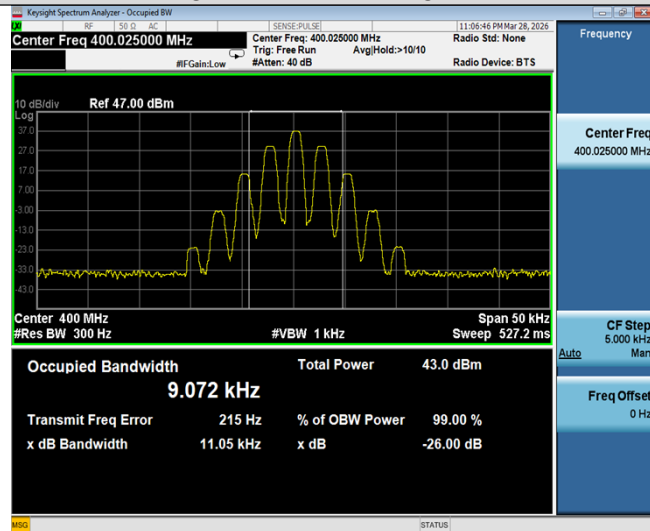
- 1 The EUT was modulated by 2.5 KHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing) and 5 kHz (25 kHz channel spacing).
- 2 Set SPA Center Frequency = fundamental frequency, set RBW=100Hz, VBW= 1 KHz, span =50 KHz for 12.5KHz mode and RBW=300Hz, VBW= 3 KHz for 25KHz mode.
- 3 Set SPA Max hold. Mark peak, set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

TEST RESULTS

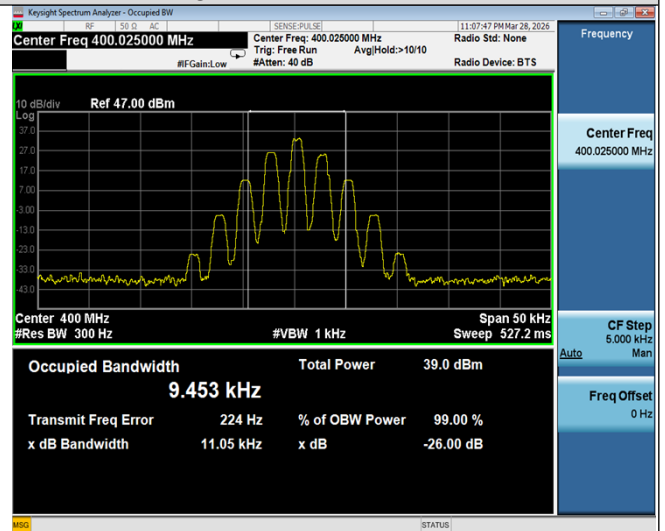
Occupied Bandwidth:

Modulation Type	Channel Separation (kHz)	Power Level	Test channel	99% OBW (kHz)	26dB bandwidth (kHz)	Limit (KHz)	Test result
Analog/FM	12.5KHz	High	CH _L	9.072	11.05	11.25	Pass
			CH _M	9.052	11.02		Pass
			CH _H	9.058	11.98		Pass
		Low	CH _L	9.453	11.05		Pass
			CH _M	9.039	11.00		Pass
			CH _H	9.108	10.98		Pass
Digital/4FSK	12.5KHz	High	CH _L	6.946	9.148	11.25	Pass
			CH _M	7.617	9.364		Pass
			CH _H	6.780	8.459		Pass
		Low	CH _L	6.862	8.937		Pass
			CH _M	6.836	9.366		Pass
			CH _H	7.228	9.115		Pass

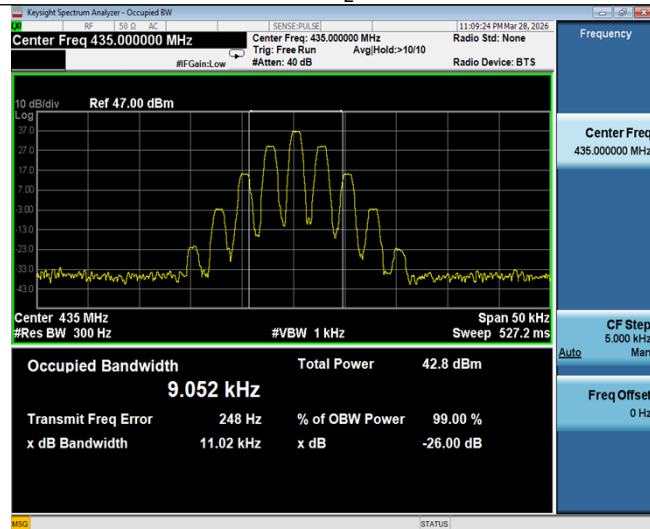
Analog/FM 12.5KHz, High power



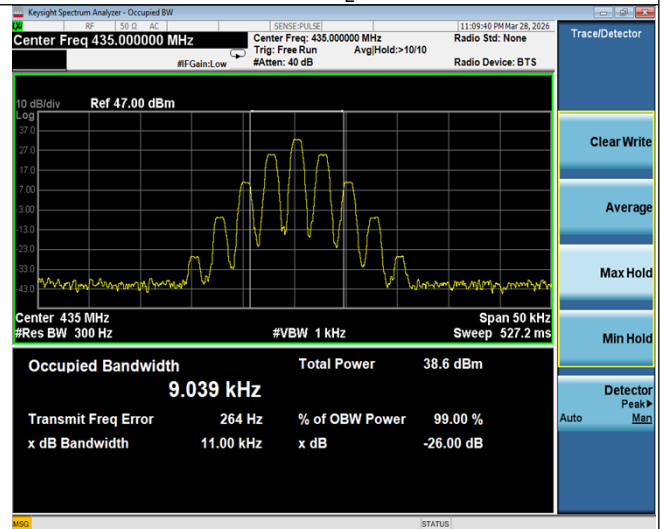
Analog/FM 12.5KHz, Low power



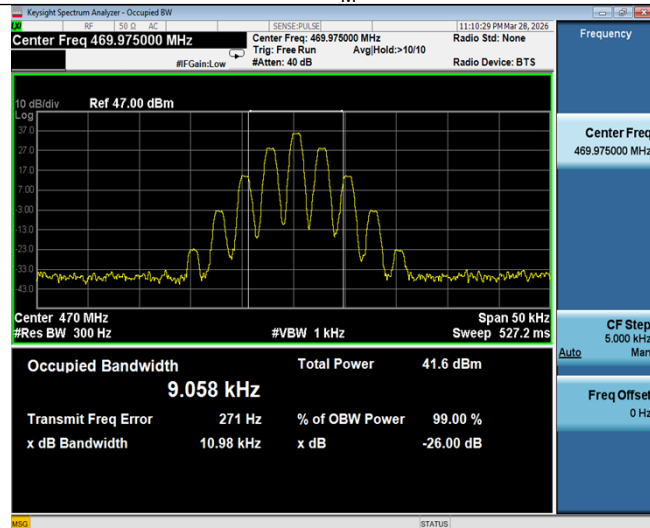
CH_L



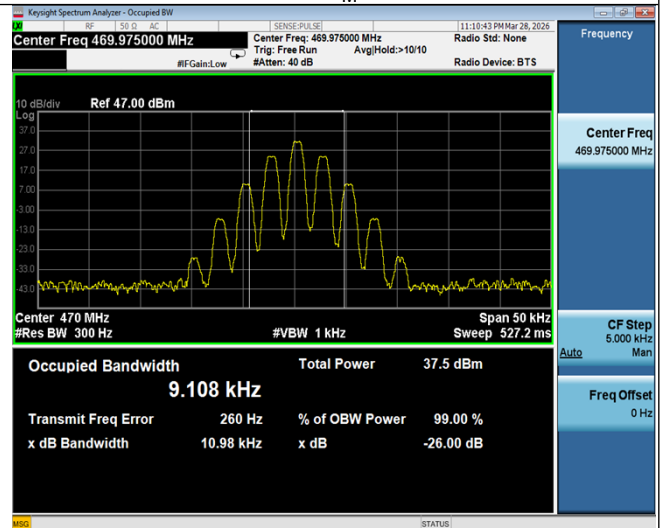
CH_L



CH_M



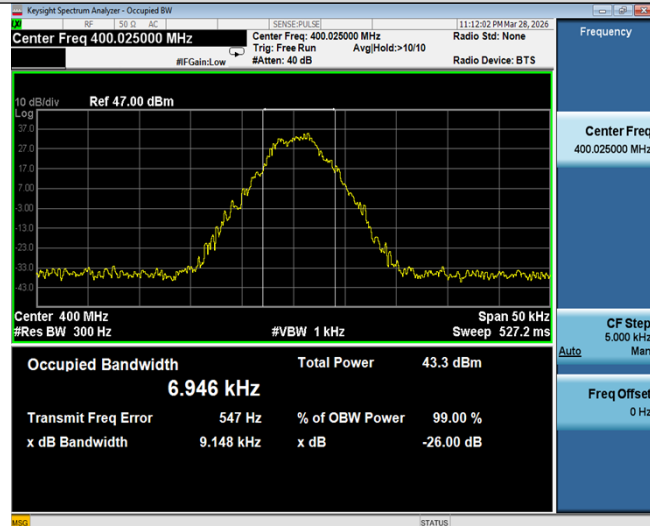
CH_M



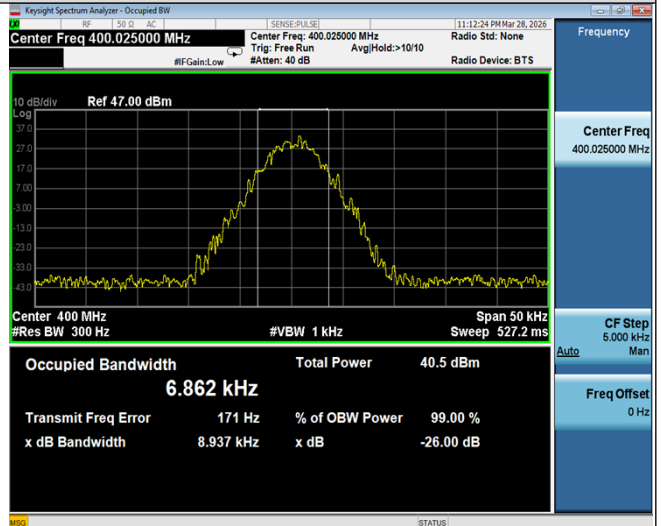
CH_H

CH_H

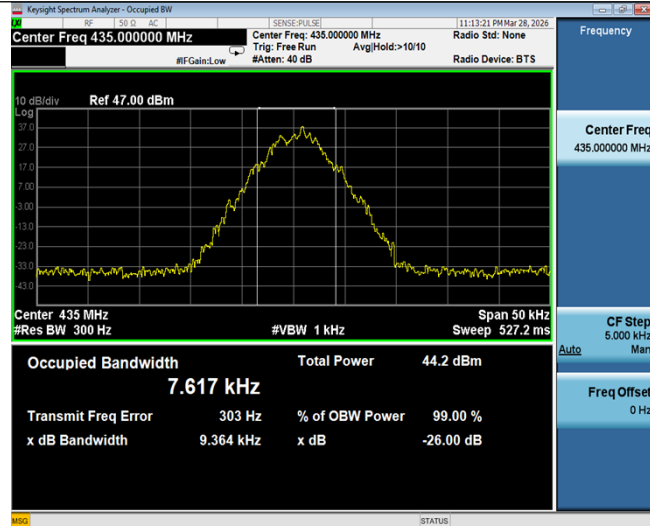
Digital/4FSK 12.5KHz, High power



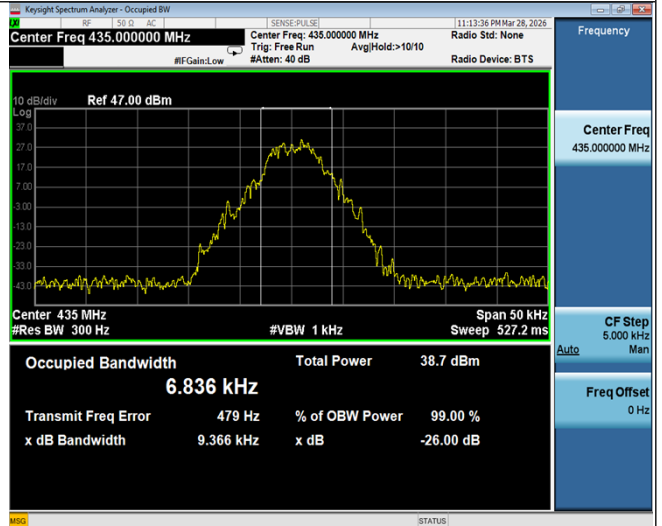
Digital/4FSK 12.5KHz, Low power



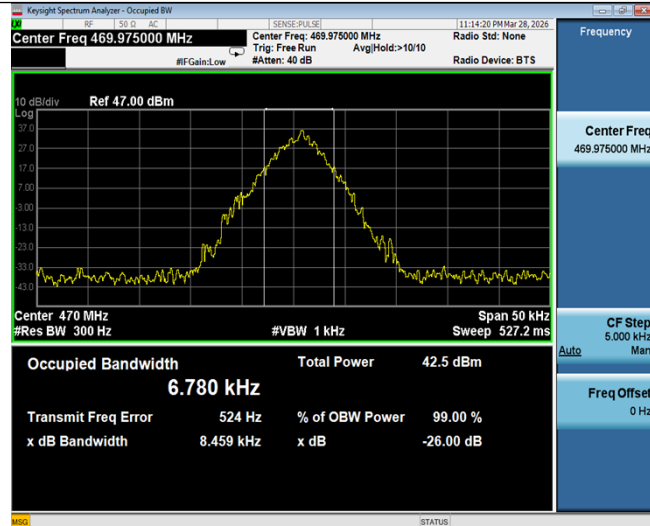
CH_L



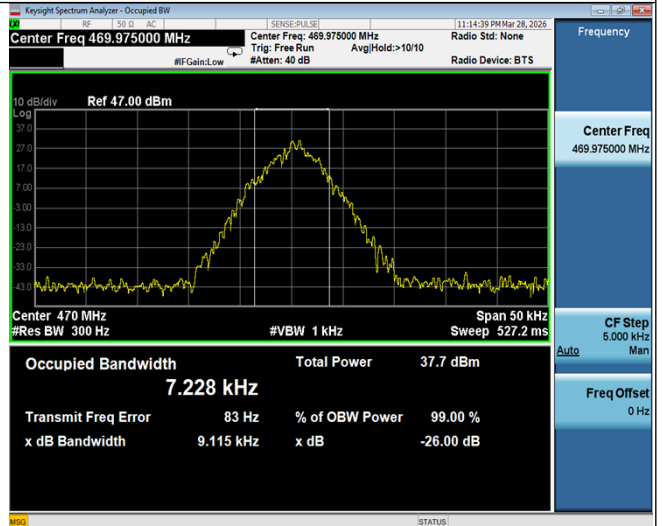
CH_L



CH_M



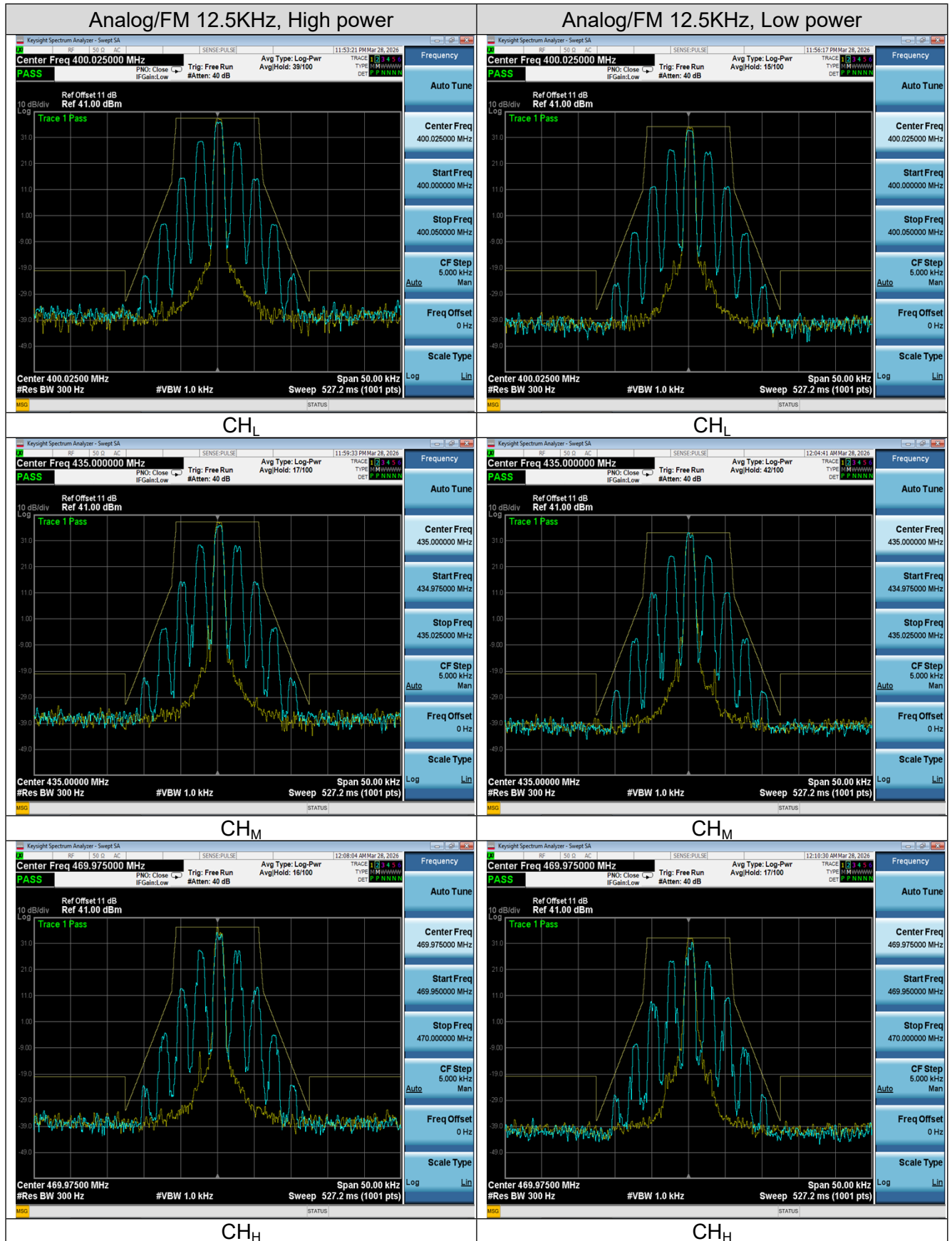
CH_M



CH_H

CH_H

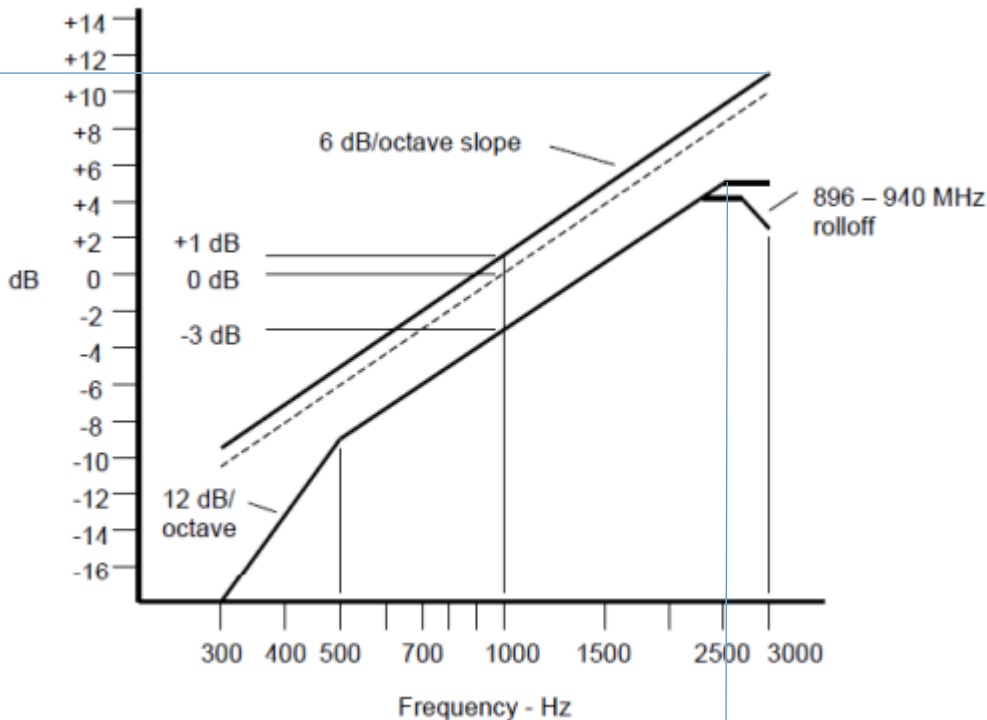
Emission Mask:



3.3 Modulation Characteristic

TEST APPLICABLE

According to CFR47 section 2.1047(a), for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.



An additional 6 dB per octave attenuation is allowed from 2500 Hz to 3000 Hz in equipment operating in the 25 MHz to 869 MHz range

TEST PROCEDURE

Modulation Limit

- 1 Configure the EUT as shown in TEST CONFIGURATION, adjust the audio input for 60% of rated system deviation at 1 KHz using this level as a reference (0dB) and vary the input level from -20 to +20dB. Record the frequency deviation obtained as a function of the input level.
- 2 Repeat step 1 with input frequency changing to 300, 1004, 1500 and 2500Hz in sequence.

Audio Frequency Response

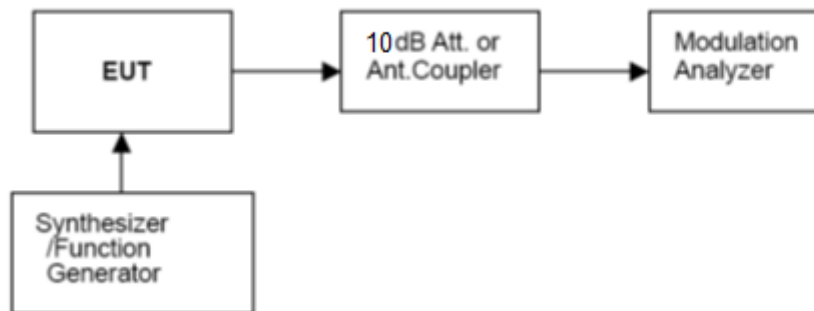
- 1 Configure the EUT as shown in TEST CONFIGURATION.
- 2 Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0dB).
- 3 Vary the Audio frequency from 100 Hz to 3 KHz and record the frequency deviation.
- 4 Audio Frequency Response = $20\log_{10} (\text{Deviation of test frequency} / \text{Deviation of 1 KHz reference})$.

Audio Low Pass Filter Response

- 1 Connect the equipment as illustrated.
- 2 Connect the Audio Generator as close as possible the input of the post limiter low pass filter
- 3 within the transmitter under test.
- 4 Connect the RF Communications Test Set to the output of the post limiter low pass filter within

- 5 the transmitter under test.
- 6 Apply a 1000 Hz tone from the audio frequency generator and adjust the level per manufacturer's specifications.
- 7 Record the dB level of the 1000 Hz spectral line on the RF Communications Test Set as LEV_{REF} .
- 8 Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.
- 9 Record RF Communications Test Set levels, at the test frequency in step 8)
- 10 Record the dB level on the RF Communications Test Set as LEV_{FREQ} .

TEST CONFIGURATION



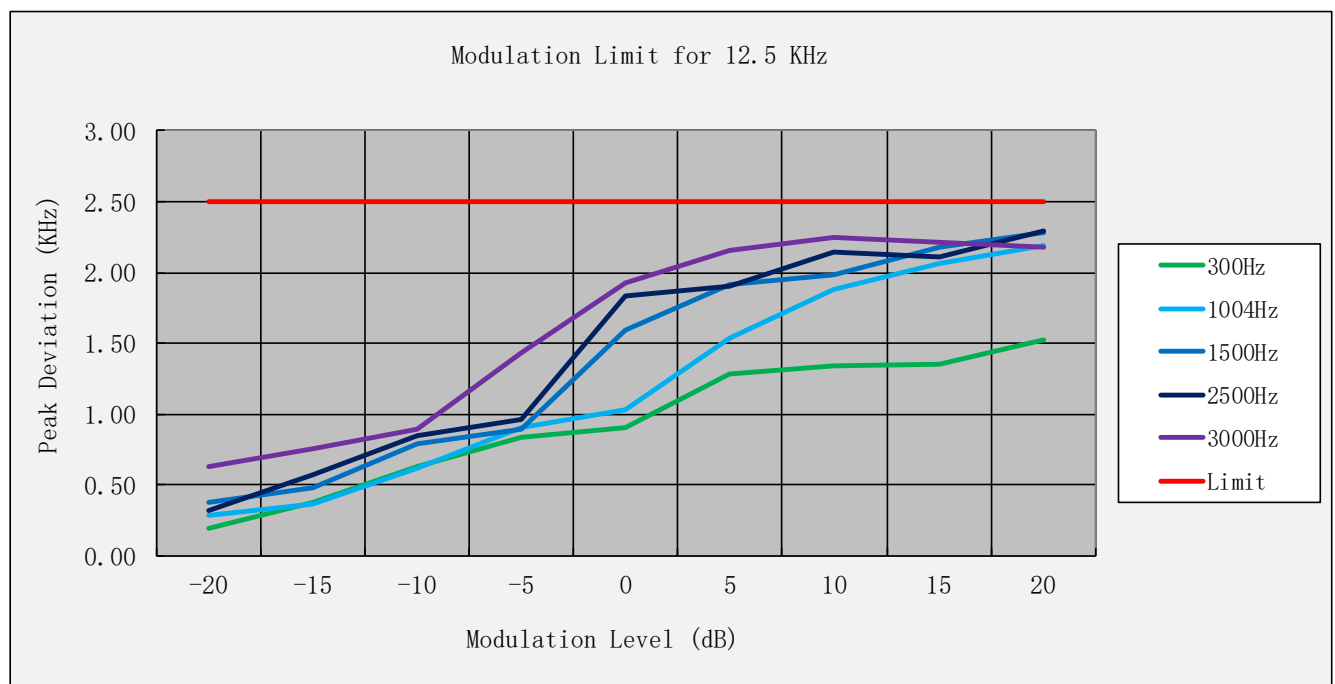
TEST RESULTS

Remark: Both test mode 1 and mode 2 have been tested, only the worst case of test mode 1 CH_M was recorded as below:

Modulation Limit:

12.5 KHz Channel Separation High Power @ 435MHz

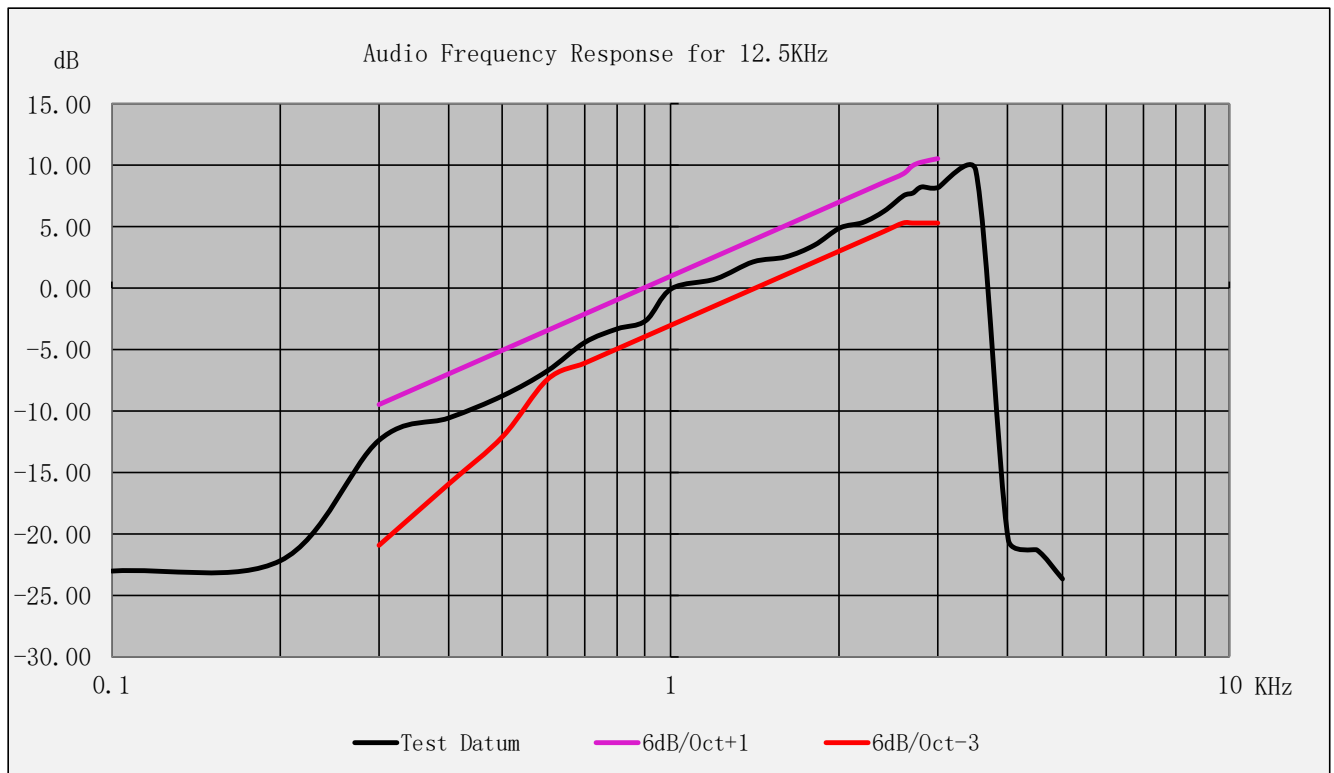
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (KHz)	Peak Freq. Deviation At 1004 Hz (KHz)	Peak Freq. Deviation At 1500 Hz (KHz)	Peak Freq. Deviation At 2500 Hz (KHz)	Peak Freq. Deviation At 3000 Hz (KHz)
-20	0.19	0.29	0.38	0.32	0.63
-15	0.38	0.37	0.48	0.57	0.76
-10	0.63	0.62	0.79	0.85	0.90
-5	0.84	0.91	0.89	0.96	1.43
0	0.91	1.03	1.60	1.83	1.93
+5	1.29	1.54	1.92	1.90	2.16
+10	1.34	1.88	1.98	2.14	2.25
+15	1.35	2.06	2.18	2.11	2.21
+20	1.53	2.19	2.28	2.29	2.18



Audio Frequency Response:

12.5 KHz Channel Separation High Power @ 435MHz

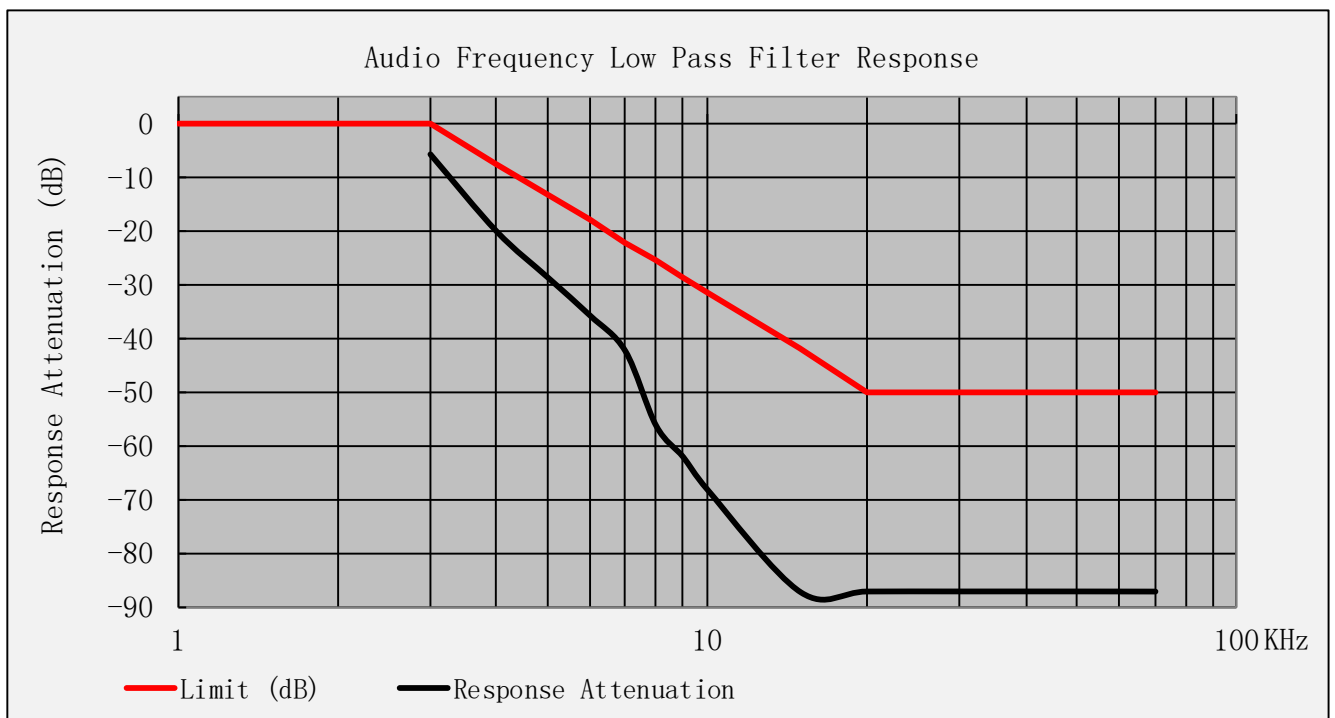
Frequency (KHz)	Frequency Deviation (KHz)	1KHz Refenerce Deviation (KHz)	Audio Frequency Response (dB)
0.1	0.07	0.92	-23.00
0.2	0.07	0.92	-22.16
0.3	0.22	0.92	-12.36
0.4	0.27	0.92	-10.53
0.5	0.34	0.92	-8.71
0.6	0.43	0.92	-6.70
0.7	0.56	0.92	-4.38
0.8	0.63	0.92	-3.27
0.9	0.68	0.92	-2.60
1.0	0.92	0.92	0.00
1.2	1.01	0.92	0.80
1.4	1.18	0.92	2.19
1.6	1.24	0.92	2.59
1.8	1.38	0.92	3.54
2.0	1.63	0.92	4.95
2.2	1.71	0.92	5.40
2.4	1.90	0.92	6.32
2.6	2.20	0.92	7.58
2.7	2.26	0.92	7.79
2.8	2.39	0.92	8.29
3.0	2.38	0.92	8.25
3.5	2.78	0.92	9.62
4.0	0.09	0.92	-20.44
4.5	0.08	0.92	-21.28
5.0	0.06	0.92	-23.64



Audio Low Pass Filter Response

12.5 KHz Channel Separation High Power @ 435MHz

Audio Frequency (KHz)	Response Attenuation (dB)	Limit (dB)
3	-5.55	0
4	-19.96	-7.5
5	-28.60	-13.31
6	-35.67	-18.06
7	-42.36	-22.08
8	-56.30	-25.56
9	-62.16	-28.63
10	-68.26	-31.37
15	-87.44	-41.94
20	-87.28	-50
30	-87.27	-50
50	-87.27	-50
70	-87.29	-50



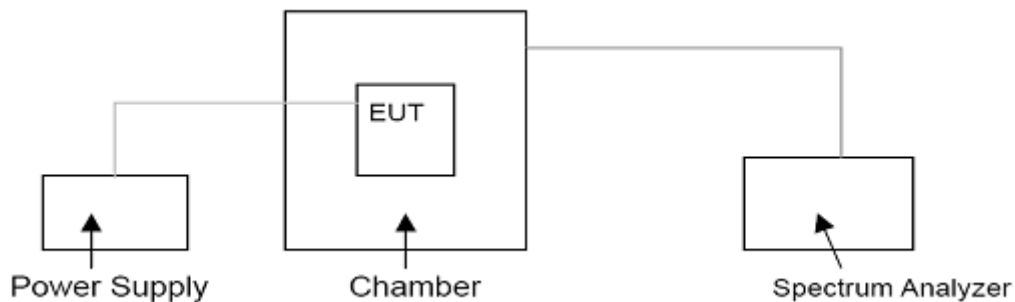
3.4 Frequency Stability

LIMITS

According to 90.213, Transmitters used must have minimum frequency stability as specified in the following table.

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	^{1 2 3} 100	100	200
25-50	20	20	50
72-76	5		50
150-174	^{5 11} 5	⁶ 5	^{4 6} 50
216-220	1.0		1.0
220-222 ¹²	0.1	1.5	1.5
421-512	^{7 11 14} 2.5	⁸ 5	⁸ 5
806-809	¹⁴ 1.0	1.5	1.5
809-824	¹⁴ 1.5	2.5	2.5
851-854	1.0	1.5	1.5
854-869	1.5	2.5	2.5
896-901	¹⁴ 0.1	1.5	1.5
902-928	2.5	2.5	2.5
902-928 ¹³	2.5	2.5	2.5
929-930	1.5		
935-940	0.1	1.5	1.5
1427-1435	⁹ 300	300	300
Above 2450 ¹⁰			

TEST CONFIGURATION



TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

TEST RESULTS

Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage(V)	Temp(°C)	CH _L	CH _M	CH _H		
7.40	-30	-1.51	-0.60	-1.16	5.0	Pass
	-20	0.64	-1.05	0.86		
	-10	-0.71	0.64	1.47		
	0	0.30	0.14	-1.18		
	10	1.53	-1.62	0.94		
	20	0.64	1.21	-1.68		
	30	-1.13	0.62	-1.36		
	40	1.33	-0.48	0.26		
	50	-1.31	-0.63	-1.49		
6.29 (85% Rated)	20	0.66	-0.18	0.67	5.0	Pass
8.51 (115% Rated)	20	-1.51	-0.60	-1.16		

3.5 Transmitter Radiated Spurious Emission

Limit

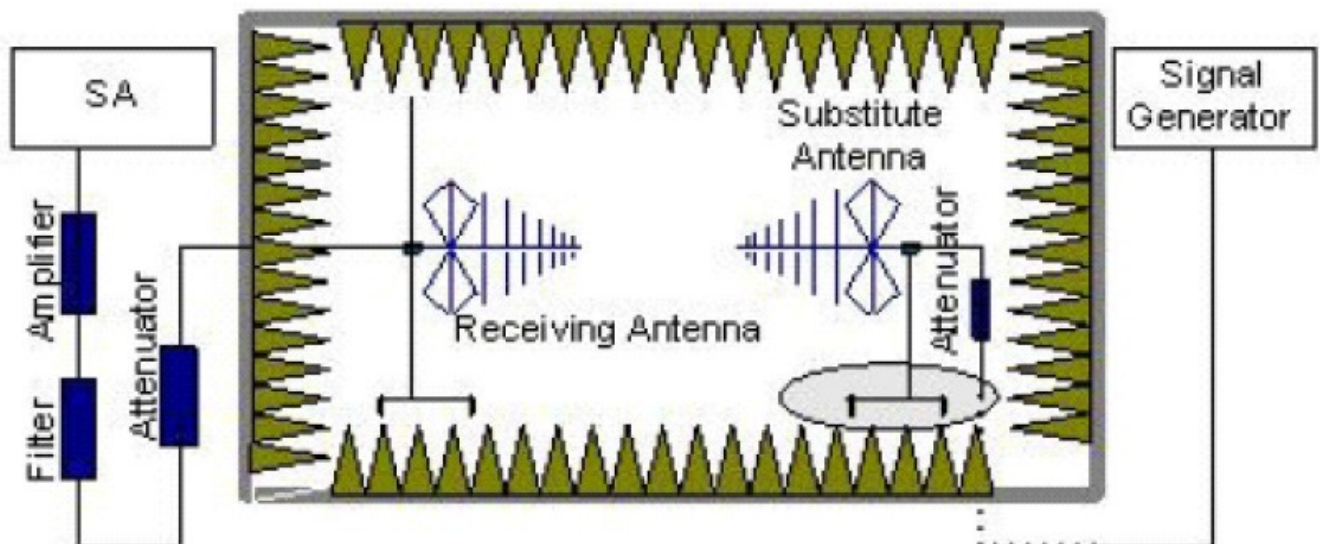
According to the TIA/EIA 603 test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

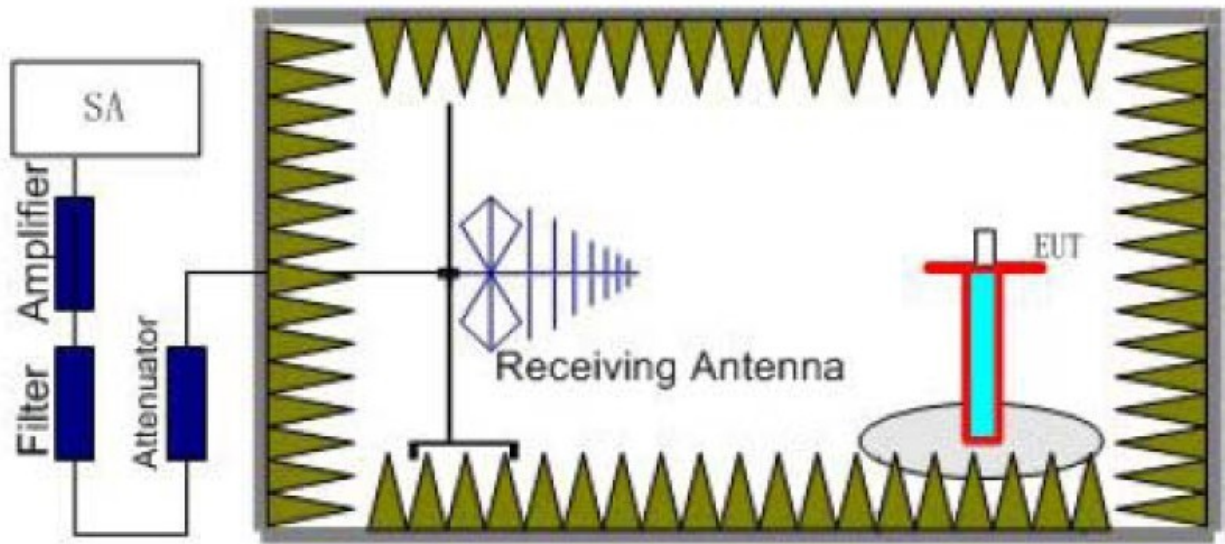
- 1 On any frequency removed from the center of the authorized bandwidth f_0 to 5.625 KHz removed from f_0 : Zero dB
- 2 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in KHz) f_0 of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27dB
- 3 On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in KHz) f_0 of more than 12.5 KHz: At least $50 + 10 \log (P)$ dB or 70 dB, whichever is lesser attenuation.

For transmitters designed to transmit with 25 KHz channel separation and equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as following:

- 1 On any frequency removed from the assigned frequency by more than 50 percent, but no more than 100 percent of the authorized bandwidth: At least 25 dB.
- 2 On any frequency removed from the assigned frequency by more than 100 percent, but no more than 250 percent of the authorized bandwidth: At least 35 dB.
- 3 On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

TEST CONFIGURATION





TEST PROCEDURE

- a. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all test transmit frequencies were measured with peak detector.
- b. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
- c. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum 100 kHz below 1GHz and 1MHz above 1GHz, Sweep from 30MHz to the 10th harmonic of the fundamental frequency; and recorded the level of the concerned spurious emission point as (P_r).
- d. The EUT then replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

The measurement results are obtained as described below:

$$\text{Power}_{(EIRP)} = P_{Mea} - P_{cl} + G_a$$

Where;

- P_{Mea} is the recorded signal generator level
- P_{cl} is the cable loss connect between instruments
- G_a Substitution Antenna Gain

- e. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
- f. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.
- g. Test site anechoic chamber refer to ANSI C63.

TEST RESULTS

Remark:

1. Test performed from test mode 1 to the mode 4, record the worst case of test mode 1 and mode 3.
2. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency; and worst spurious emissions recorded as below:

Test mode 1: Analog/FM 12.5KHz, High power

Test Channel:CH _L							
Frequency(MHz)	P _{Mea} (dBm)	G _a Antenna Gain(dBi)	P _{cl} (dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dBm)	Polarity
801.95	-38.88	6.10	2.51	-35.29	-20.00	-15.29	H
1201.60	-36.46	6.23	2.58	-32.81	-20.00	-12.81	H
1601.20	-46.41	8.96	2.93	-40.38	-20.00	-20.38	H
2001.20	-50.06	9.60	3.48	-43.94	-20.00	-23.94	H
--	--	--	--	--	--	--	H
801.95	-38.05	6.10	2.51	-34.46	-20.00	-14.46	V
1201.60	-36.19	6.23	2.58	-32.54	-20.00	-12.54	V
1601.20	-45.69	8.96	2.93	-39.66	-20.00	-19.66	V
2001.20	-49.27	9.60	3.48	-43.15	-20.00	-23.15	V
--	--	--	--	--	--	--	V
Test Channel:CH _M							
Frequency(MHz)	P _{Mea} (dBm)	G _a Antenna Gain(dBi)	P _{cl} (dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dBm)	Polarity
870.00	-39.43	5.89	2.68	-36.22	-20.00	-16.22	H
1305.50	-40.21	6.92	2.76	-36.05	-20.00	-16.05	H
1740.45	-46.38	9.77	3.21	-39.82	-20.00	-19.82	H
2175.15	-50.39	9.68	3.62	-44.33	-20.00	-24.33	H
--	--	--	--	--	--	--	H
870.00	-39.14	5.89	2.68	-35.93	-20.00	-15.93	V
1305.50	-39.37	6.92	2.76	-35.21	-20.00	-15.21	V
1740.45	-45.28	9.77	3.21	-38.72	-20.00	-18.72	V
2175.15	-49.36	9.68	3.62	-43.30	-20.00	-23.30	V
--	--	--	--	--	--	--	V
Test Channel:CH _H							
Frequency(MHz)	P _{Mea} (dBm)	G _a Antenna Gain(dBi)	P _{cl} (dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dBm)	Polarity
940.00	-37.38	5.96	2.85	-34.27	-20.00	-14.27	H
1410.45	-39.70	7.61	2.71	-34.80	-20.00	-14.80	H
1880.90	-48.52	9.95	3.14	-41.71	-20.00	-21.71	H
2350.00	-53.09	10.27	3.84	-46.66	-20.00	-26.66	H
--	--	--	--	--	--	--	H
940.00	-36.56	5.96	2.85	-33.45	-20.00	-13.45	V
1410.45	-38.72	7.61	2.71	-33.82	-20.00	-13.82	V
1880.90	-47.86	9.95	3.14	-41.05	-20.00	-21.05	V
2350.00	-52.67	10.27	3.84	-46.24	-20.00	-26.24	V
--	--	--	--	--	--	--	V

Remark:

1. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
2. -- Means other points for values lower than limits and not recorded.
3. $Margin = Limit - EIRP$

Test mode 3: Digital/4FSK 12.5KHz, High power

Test Channel:CH _L							
Frequency(MHz)	P _{Mea} (dBm)	G _a Antenna Gain(dBi)	P _{cl} (dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dBm)	Polarity
801.50	-39.41	6.10	2.51	-35.82	-20.00	-15.82	H
1201.35	-40.99	6.22	2.58	-37.35	-20.00	-17.35	H
1601.75	-47.23	8.97	2.93	-41.19	-20.00	-21.19	H
2001.10	-49.56	9.60	3.48	-43.44	-20.00	-23.44	H
--	--	--	--	--	--	--	H
801.50	-38.89	6.10	2.51	-35.30	-20.00	-15.30	V
1201.35	-39.86	6.22	2.58	-36.22	-20.00	-16.22	V
1601.75	-46.41	8.97	2.93	-40.37	-20.00	-20.37	V
2001.10	-48.59	9.60	3.48	-42.47	-20.00	-22.47	V
--	--	--	--	--	--	--	V
Test Channel:CH _M							
Frequency(MHz)	P _{Mea} (dBm)	G _a Antenna Gain(dBi)	P _{cl} (dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dBm)	Polarity
870.80	-37.56	5.89	2.68	-34.35	-20.00	-14.35	H
1305.45	-38.57	6.92	2.76	-34.41	-20.00	-14.41	H
1740.65	-46.20	9.77	3.21	-39.64	-20.00	-19.64	H
2175.15	-48.61	9.68	3.62	-42.55	-20.00	-22.55	H
--	--	--	--	--	--	--	H
870.80	-36.56	5.89	2.68	-33.35	-20.00	-13.35	V
1305.45	-37.71	6.92	2.76	-33.55	-20.00	-13.55	V
1740.65	-45.35	9.77	3.21	-38.79	-20.00	-18.79	V
2175.15	-47.43	9.68	3.62	-41.37	-20.00	-21.37	V
--	--	--	--	--	--	--	V
Test Channel:CH _H							
Frequency(MHz)	P _{Mea} (dBm)	G _a Antenna Gain(dBi)	P _{cl} (dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dBm)	Polarity
940.80	-39.78	5.97	2.86	-36.67	-20.00	-16.67	H
1410.65	-37.46	7.61	2.71	-32.56	-20.00	-12.56	H
1880.00	-46.80	9.95	3.14	-39.99	-20.00	-19.99	H
2350.45	-48.52	10.27	3.84	-42.09	-20.00	-22.09	H
--	--	--	--	--	--	--	H
940.80	-38.69	5.97	2.86	-35.58	-20.00	-15.58	V
1410.65	-36.56	7.61	2.71	-31.66	-20.00	-11.66	V
1880.00	-45.71	9.95	3.14	-38.90	-20.00	-18.90	V
2350.45	-47.94	10.27	3.84	-41.51	-20.00	-21.51	V
--	--	--	--	--	--	--	V

Remark:

1. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
2. -- Means other points for values lower than limits and not recorded.
3. $Margin = Limit - EIRP$

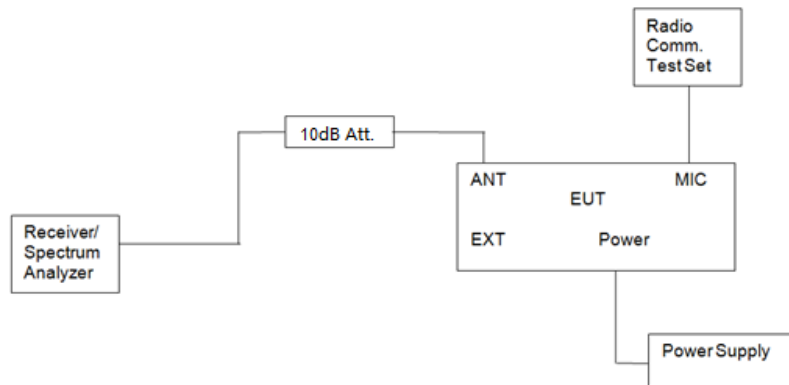
3.6 Spurious Emission on Antenna Port

Limit

FCC Part 90.210, FCC Part 2.1051

On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log (P)$ dB or 70 dB, whichever is the lesser attenuation.

TEST CONFIGURATION



TEST PROCEDURE

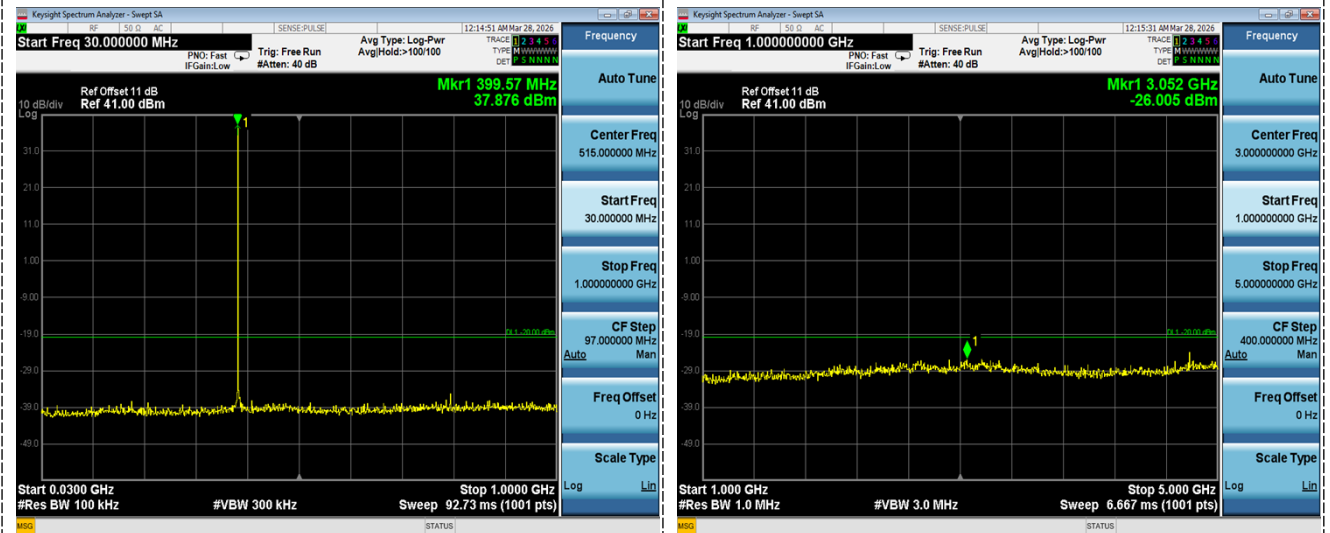
The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set to 100 kHz. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range. Set RBW 100 kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz, while set RBW=1MHz.VBW=3MHz from the 1GHz to 10th Harmonic.

TEST RESULTS

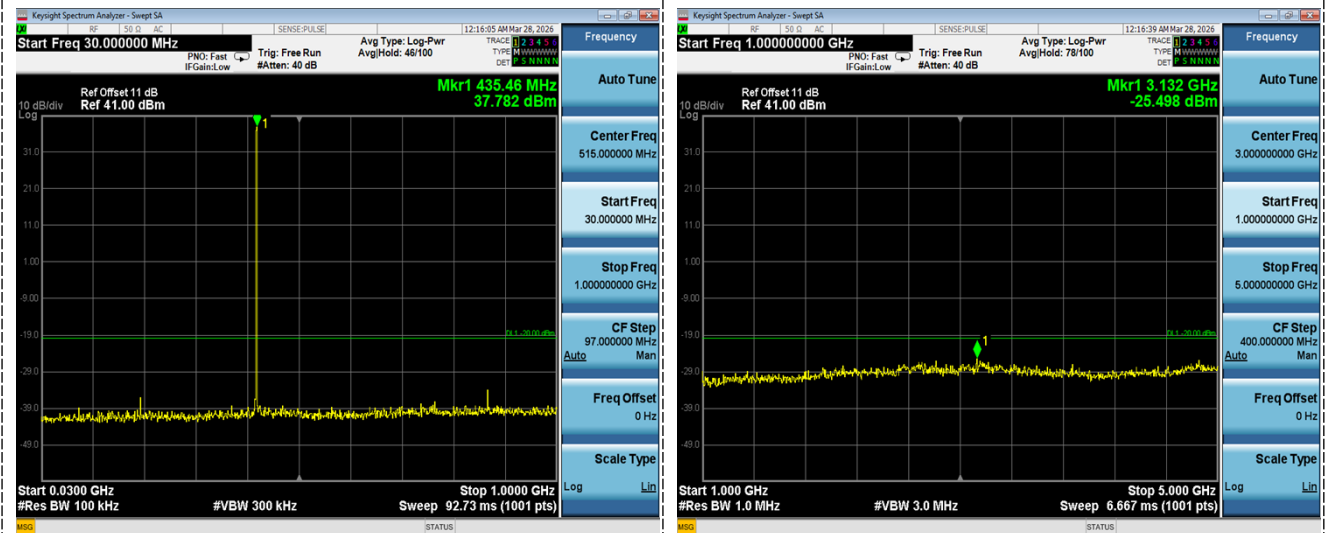
Remark:

1. Test performed from test mode 1 to the mode 4, record the worst case of test mode 1 and mode 3.
- 2.The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency; and worst spurious emissions recorded as below:

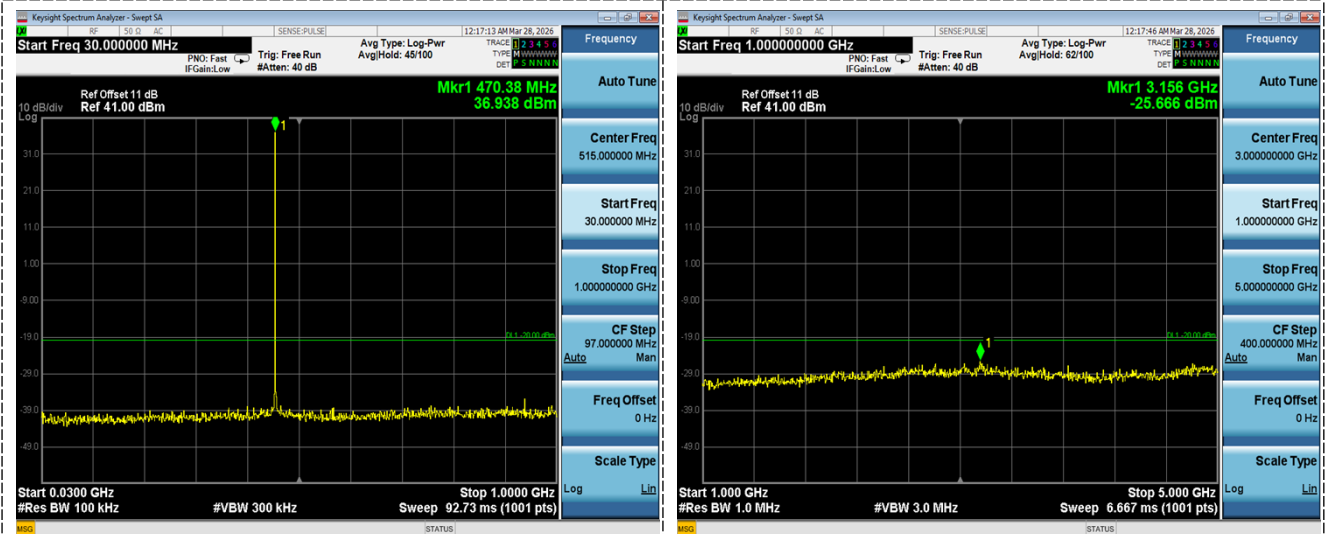
Test mode 1: Analog/FM 12.5KHz, High power



CH₁

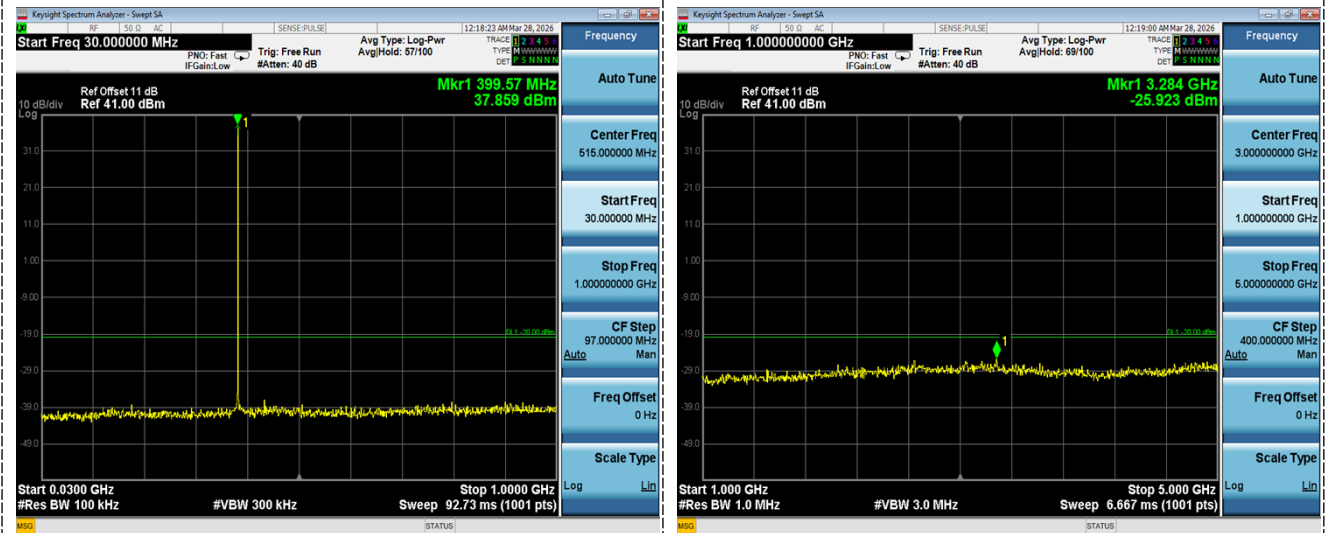


CH_M

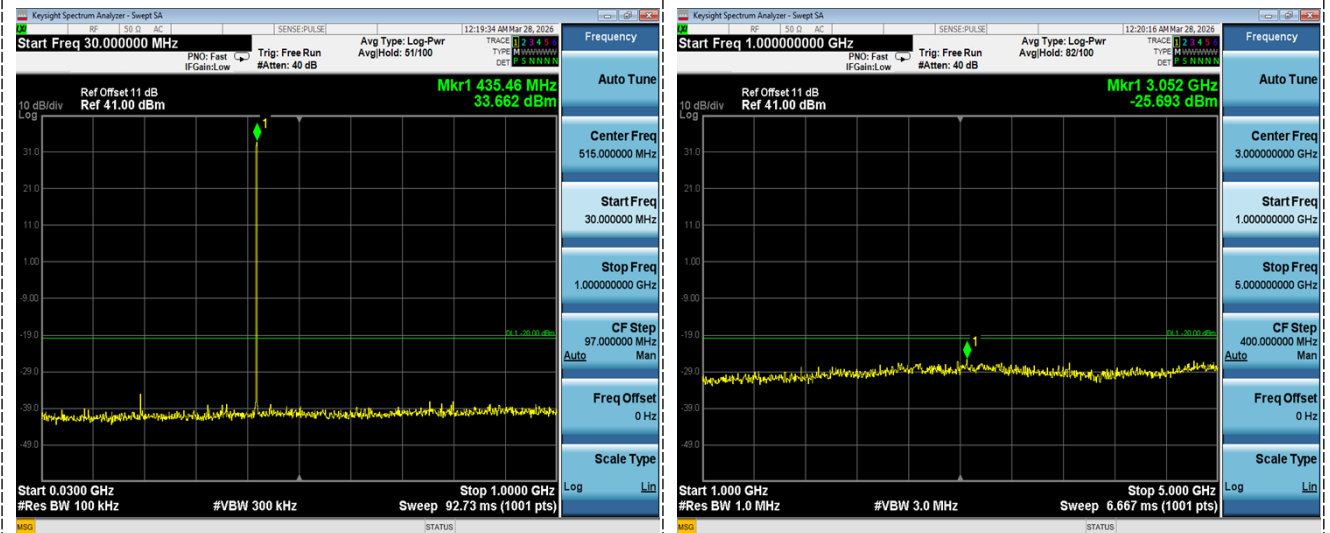


CH_H

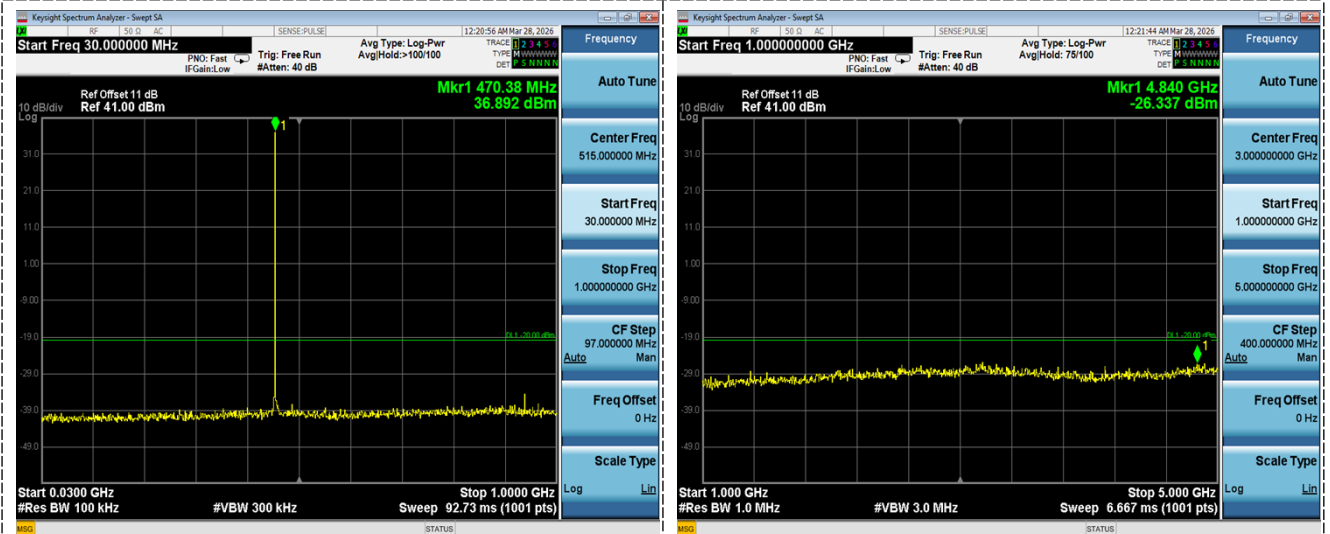
Test mode 3: Digital/4FSK 12.5KHz, High power



CH₁



CH_M



CH_H

3.7 Transmitter Frequency Behavior

TEST APPLICABLE

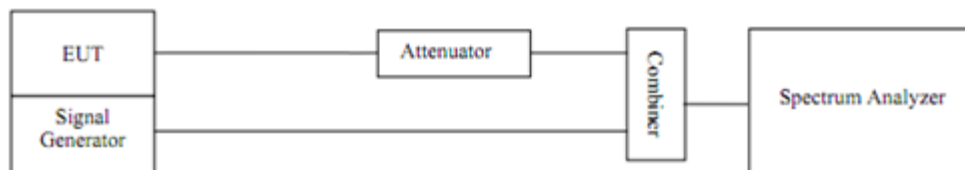
Section 90.214

Transient frequencies must be within the maximum frequency difference limits during the time intervals indicated:

Time intervals ^{1, 2}	Maximum frequency difference ³	All equipment	
		150 to 174 MHz	421 to 512MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 KHz Channels			
t ₁ ⁴	± 25.0 KHz	5.0 ms	10.0 ms
t ₂	± 12.5 KHz	20.0 ms	25.0 ms
t ₃ ⁴	± 25.0 KHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 KHz Channels			
t ₁ ⁴	± 12.5 KHz	5.0 ms	10.0 ms
t ₂	± 6.25 KHz	20.0 ms	25.0 ms
t ₃ ⁴	± 12.5 KHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 KHz Channels			
t ₁ ⁴	±6.25 KHz	5.0 ms	10.0 ms
t ₂	±3.125 KHz	20.0 ms	25.0 ms
t ₃ ⁴	±6.25 KHz	5.0 ms	10.0 ms

- t_{on} is the instant when a 1 KHz test signal is completely suppressed, including any capture time due to phasing.
 t_1 is the time period immediately following t_{on} .
 t_2 is the time period immediately following t_1 .
 t_3 is the time period from the instant when the transmitter is turned off until t_{off} .
 t_{off} is the instant when the 1 KHz test signal starts to rise.
- During the time from the end of t_2 to the beginning of t_3 , the frequency difference must not exceed the limits specified in § 90.213.
- Difference between the actual transmitter frequency and the assigned transmitter frequency.
- If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

TEST CONFIGURATION



TEST PROCEDURE

- Connect the EUT and test equipment as shown in the test configuration.
- Set Spectrum Analyzer to measure FM deviation, and tune the RF frequency to transmitter assigned frequency.
- Set the signal generator to the assigned transmitter frequency and modulate it with a 1KHz tone at ± 12.5 Khz deviation and set its output level to -100dBm.
- Turn on the transmitter.
- Supply sufficient attenuation via RF attenuator to provide an input level to the Spectrum Analyzer that is 40dB below the maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on Spectrum Analyzer as P_0 .
- Turn off the transmitter.
- Adjust the RF level of the signal generator to provide RF power equal to P_0 . This signal generator RF level shall be maintained throughout the rest of the measurement.
- Remove the attenuation 1, so the input power to the Spectrum Analyzer is increased by 30dB when the transmitter is turned on.
- Adjust the vertical amplitude control of the spectrum analyzer to display the 1000Hz at ± 4

divisions vertically centered on display. Set trigger mode of the Spectrum Analyzer to "Video", and tune the "trigger level" on suitable level. Then set the "trigger offset" to -10ms for turn on and -15ms for turn off.

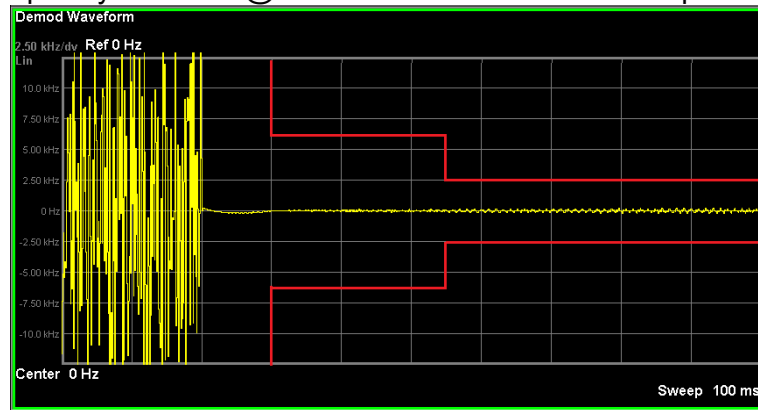
10. Turn on the transmitter and the transient wave will be captured on the screen of Spectrum Analyzer. Observe the stored display. The instant when the 1 KHz test signal is completely suppressed is considered to be t_{on} . The trace should be maintained within the allowed divisions during the period t_1 and t_2 .
11. Then turn off the transmitter, and another transient wave will be captured on the screen of Spectrum Analyzer. The trace should be maintained within the allowed divisions during the period t_3 .

TEST RESULTS

Remark: All the test frequencies was tested, but only the worst data was recorded as below:

Modulation Type: FM

Transmitter Frequency Behavior @ 435MHz 12.5 KHz Channel Separation-----Off – On



Transmitter Frequency Behavior @ 435MHz 12.5 KHz Channel Separation-----On – Off

