



RF TEST REPORT

Product Name: Smart LTE Terminal

Model Name: BN500, TELOX-BN500, BN500L, BN500M, BN500K, BN500P

FCC ID: 2AYEZ-BN500

Issued For : Telo Communication (Shenzhen) Co., Ltd

6/F, No. 42 Liuxian 1st Road, Bao'an District, Shenzhen,
China

Issued By : Shenzhen LGT Test Service Co., Ltd.

Room 205, Building 13, Zone B, Zhenxiong Industrial Park,
No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan
District, Shenzhen, Guangdong, China

Report Number: LGT24D184RF09

Sample Received Date: Apr. 30, 2024

Date of Test: Apr. 30, 2024 – Jun. 20, 2024

Date of Issue: Jun. 20, 2024

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TEST REPORT CERTIFICATION

Applicant: Telo Communication (Shenzhen) Co., Ltd
Address: 6/F, No. 42 Liuxian 1st Road, Bao'an District, Shenzhen, China
Manufacturer: Telo Communication (Shenzhen) Co., Ltd
Address: 6/F, No. 42 Liuxian 1st Road, Bao'an District, Shenzhen, China
Product Name: Smart LTE Terminal
Trademark: TELOX
Model Name: BN500, TELOX-BN500, BN500L, BN500M, BN500K, BN500P
Sample Status: Normal

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC Part 90 ANSI C63.26-2015	PASS

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Technical Director





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Revision History

Rev.	Issue Date	Contents
00	Jun. 20, 2024	Initial Issue



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 90			
Standard Section	Test Item	Judgment	Remark
Part 2.1046, Part 90.205	Maximum Transmitter Power	PASS	--
Part 2.1049, Part 90.209	Occupied Bandwidth	PASS	--
Part 90.210	Emission Mask	PASS	--
Part 2.1051, Part 90.210	Transmitter Radiated Spurious Emssion	PASS	--
Part 2.1053, Part 90.210	Spurious Emssion on Antenna Port	PASS	--
Part 2.1055, Part 90.213	Frequency Stability Test	PASS	--
Part 90.214	Transisent Frequency Behavior	PASS	--
Part 2.1047, Part 90.214	Modulation Characteristic	PASS	--

NOTE:

(1) 'N/A' denotes test is not applicable in this Test Report.



1.1 TEST FACTORY

Company Name:	Shenzhen LGT Test Service Co., Ltd.
Address:	Room 205, Building 13, Zone B, Zhenxiong Industrial Park, No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China
Accreditation Certificate	A2LA Certificate No.: 6727.01
	FCC Registration No.: 746540
	CAB ID: CN0136

1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 9K-30MHz	$\pm 2.84\text{dB}$
4	All emissions, radiated 30M-1GHz	$\pm 4.39\text{dB}$
5	All emissions, radiated 1G-6GHz	$\pm 5.10\text{dB}$
6	All emissions, radiated >6G	$\pm 5.48\text{dB}$
7	Conducted Emission (9KHz-150KHz)	$\pm 2.79\text{dB}$
8	Conducted Emission (150KHz-30MHz)	$\pm 2.80\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name:	Smart LTE Terminal
Trademark:	TELOX
Model Name:	BN500
Series Model:	TELOX-BN500, BN500L, BN500M, BN500K, BN500P
Model Difference:	The only differences are the model name for commercial purpose.
Operation Frequency:	400-470MHz
Modulation Type:	FM, 4FSK
Channel Separation:	12.5KHz
Antenna Type:	External Antenna
Antenna Gain (dBi):	2.15
Channel List:	Please refer to the Note 3.
Adapter:	Input: 100-240V, 50/60Hz, 0.3A Output: 5V, 2.0A
Battery:	Capacity: 4000 mAh Rated Voltage: 3.8V
Hardware Version:	RH03_V1.0
Software Version:	BN500_DEU_V1_20240123
Connecting I/O Port(s):	Please refer to the Note 1.

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.
2. The antenna information refers to the manufacturer provide report, applicable only to the tested sample identified in the report. Due to the incorrect antenna information, a series of problems such as the accuracy of the test results will be borne by the customer.
3. Test channel:

Channel	Frequency (MHz)
1	400.0125
2	435.0000
3	469.9875



2.2 DESCRIPTION OF THE TEST MODES

For conducted test items and radiated spurious emissions

Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

Pretest Mode	Description
Mode 1	CH1 TX FM Mode
Mode 2	CH2 TX FM Mode
Mode 3	CH3 TX FM Mode
Mode 4	CH1 TX 4FSK Mode
Mode 5	CH2 TX 4FSK Mode
Mode 6	CH3 TX 4FSK Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH1 TX FM Mode
Mode 2	CH2 TX FM Mode
Mode 3	CH3 TX FM Mode
Mode 4	CH1 TX 4FSK Mode
Mode 5	CH2 TX 4FSK Mode
Mode 6	CH3 TX 4FSK Mode

Note:

- (1) All above mode has been measurement, only worst data was reported.
- (2) The battery is fully-charged during the radiated and RF conducted test.



2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Accessories Equipment

Description	Manufacturer	Model	S/N	Rating
Adapter	Shenzhen Mao Two Power Co., Ltd	MR-0502000US	N/A	Input: 100-240V ~ 50/60Hz 0.3A Output: 5V, 2A
USB-A to USB-C Cable	N/A	N/A	N/A	1m

Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) “YES” is means “with core”; “NO” is means “without core”.



2.4 EQUIPMENTS LIST

Radiated Test equipment					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
EMI Test Receiver	R&S	ESU8	100372	2024.03.09	2025.03.08
Active loop Antenna	ETS	6502	00049544	2023.10.13	2025.10.12
Spectrum Analyzer	Keysight	N9010B	MY60242508	2023.08.14	2024.08.13
Bilog Antenna(30M-1G)	SCHWARZBECK	VULB 9168	2705	2022.12.12	2025.12.11
Horn Antenna(1-18G)	SCHWARZBECK	3115	10SL0060	2022.06.02	2025.06.01
Pre-amplifier(30M-1G)	EMtrace	RP01A	02019	2024.03.09	2025.03.08
Pre-amplifier(1-26.5G)	Agilent	8449B	3008A4722	2024.03.09	2025.03.08
Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
Testing Software	EMC-I_V1.4.0.3_SKET				

Conducted Test equipment					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Signal Analyzer	Keysight	N9010B	MY60242508	2023.08.14	2024.08.13
Signal Analyzer	Keysight	N9020A	MY50530994	2024.03.09	2025.03.08
MXG Vector Signal Generator	Keysight	N5182B	MY59100717	2024.03.09	2025.03.08
Temperature& Humidity test chamber	AISRY	LX-1000L	171200018	2024.03.09	2025.03.08
Audio Analyzer	R&S	UPL	N/A	2023.10.12	2024.10.11
Temperature & Humidity	JINGCHUANG	BT-3	N.A	2024.03.11	2025.03.10
Temperature& Humidity test chamber	AISRY	LX-1000L	171200018	2024.03.09	2025.03.08
Attenuator	eastsheep	90db	N.A	2024.03.09	2025.03.08
Testing Software	MTS8200_V2.0.0.0_MW				



3. MAXIMUM TRANSMITTER POWER

3.1 LIMITS

Per FCC Part 2.1046 and Part 90.205: The output power shall not exceed by more than 20 percent either the output power shown in the Radio Equipment List [available in accordance with § 90.203(a)(1)] for transmitters included in this list or when not so listed, the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

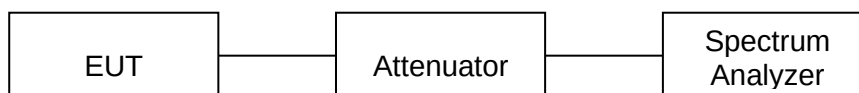
3.2 TEST PROCEDURE

Measurements shall be made to establish the radio frequency power delivered by the transmitter the standard output termination. The power output shall be monitored and recorded and no adjustment shall be made to the transmitter after the test has begun, except as noted below: If the power output is adjustable, measurements shall be made for the highest and lowest power levels. The EUT connect to the Spectrum Analyzer through 30 dB attenuator.

3.3 DEVIATION FROM TEST STANDARD

No deviation

3.4 TEST SETUP BLOCK DIAGRAM



3.5 TEST RESULT

Modulation Type	Channel Sparation	Test Channel	Test Frequency (MHz)	Test Results (dBm)	Antenna Gain (dBi)	ERP (dBm)	Test Results (W)	Limit (W)
FM	12.5KHz	CH1	400.0125	31.492	2.150	31.492	1.41	1.04-1.56
		CH2	435.0000	31.556	2.150	31.556	1.43	
		CH3	469.9875	31.184	2.150	31.184	1.31	
4FSK	12.5KHz	CH1	400.0125	31.692	2.150	31.692	1.48	1.04-1.56
		CH2	435.0000	31.633	2.150	31.633	1.46	
		CH3	469.9875	31.293	2.150	31.293	1.35	

Note: The rate power is 1.3W. The limit of the high output power is 1.04~1.56W.



4. OCCUPIED BANDWIDTH

4.1 LIMIT

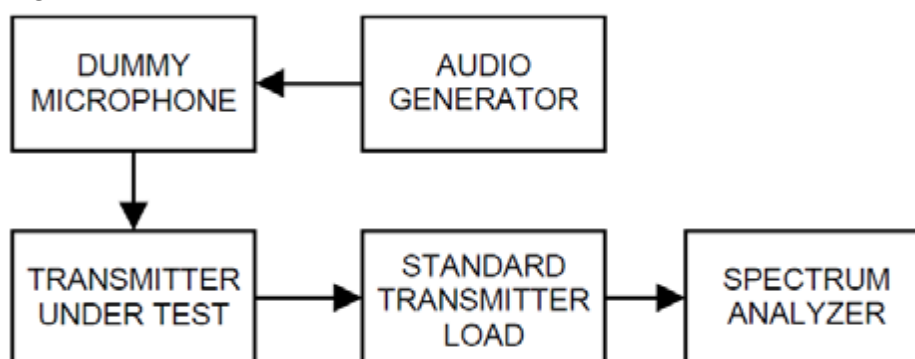
Occupied Bandwidth: The EUT was connected to the audio signal generator and the spectrum analyzer via the main RF connector, and through an appropriate attenuator. The EUT was controlled to transmit its maximum power. Then the bandwidth of 99% power can be measured by the spectrum analyzer.

The maximum authorized bandwidth shall not be more than that normally authorized for voice operations.

4.2 TEST PROCEDURE

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

4.3 TEST SETUP



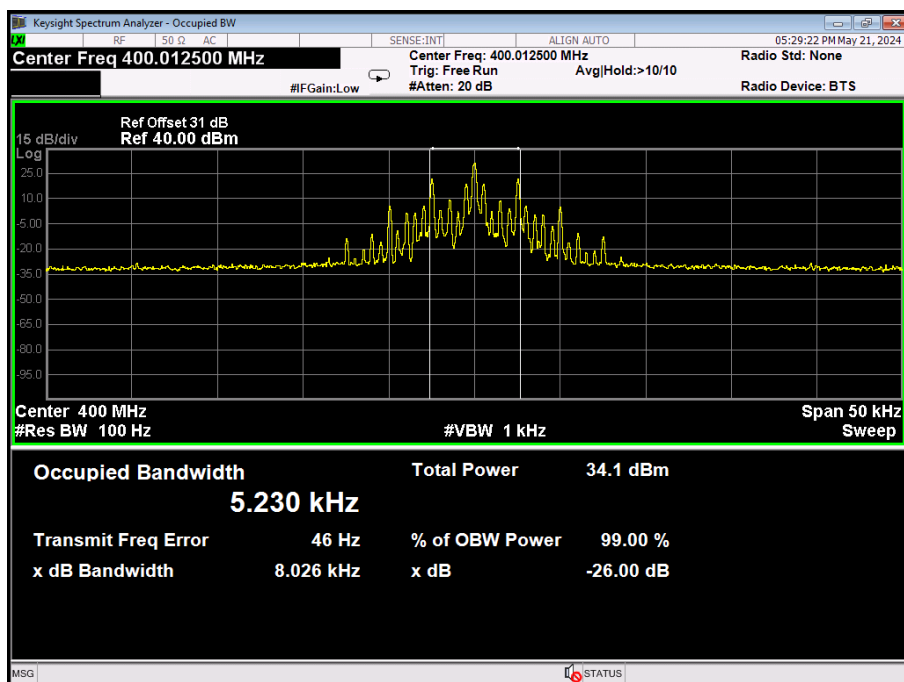
4.4 TEST RESULT

Modulation Type	Channel Bandwidth	Test Channel	Test Frequency (MHz)	Occupied Bandwidth (KHz)		Limits (KHz)
				99%	26dB	
FM	12.5KHz	CH1	400.0125	5.230	8.026	11.25
		CH2	435.0000	5.876	10.070	
		CH3	469.9875	6.906	10.060	
4FSK	12.5KHz	CH1	400.0125	7.507	9.449	11.25
		CH2	435.0000	7.425	9.707	
		CH3	469.9875	7.572	9.608	

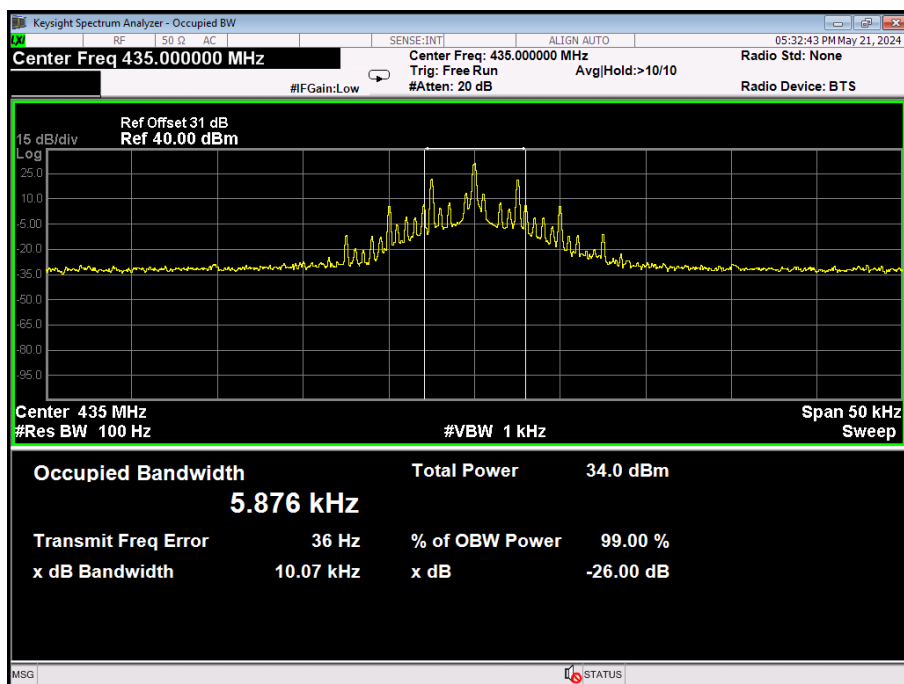


FM Modulation

CH1

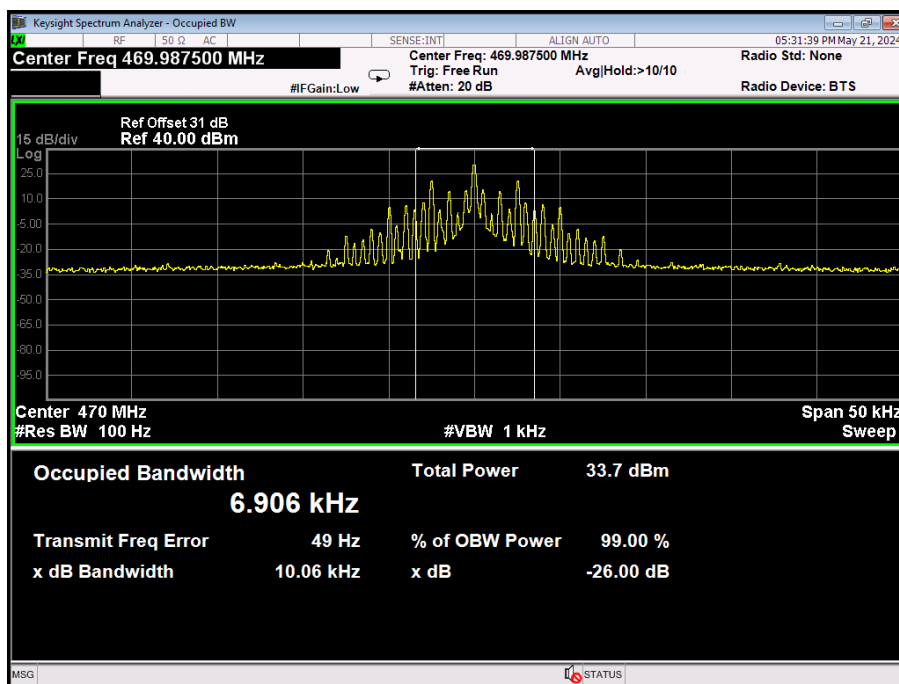


CH2



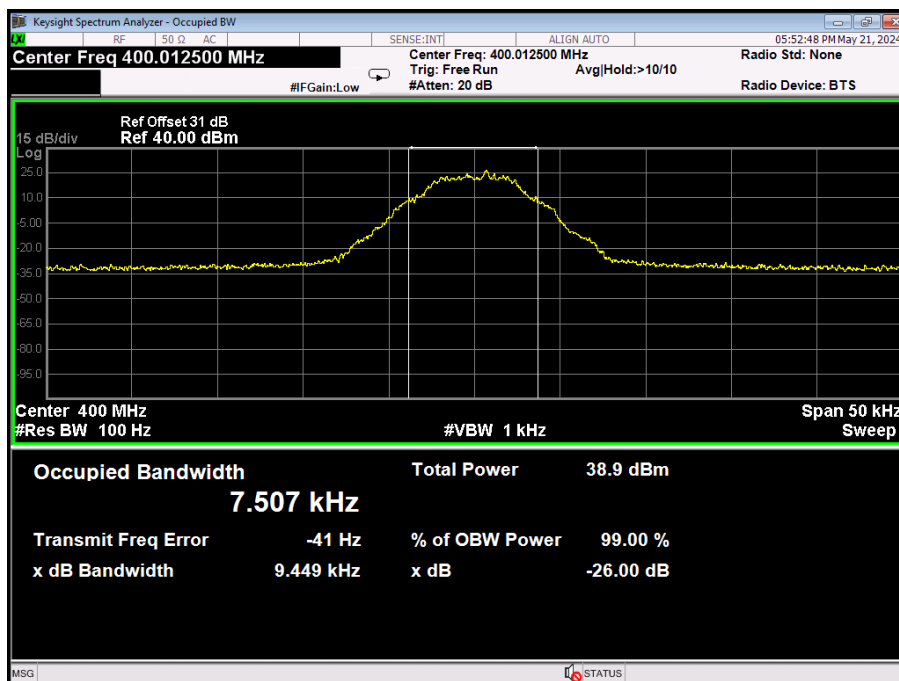


CH3



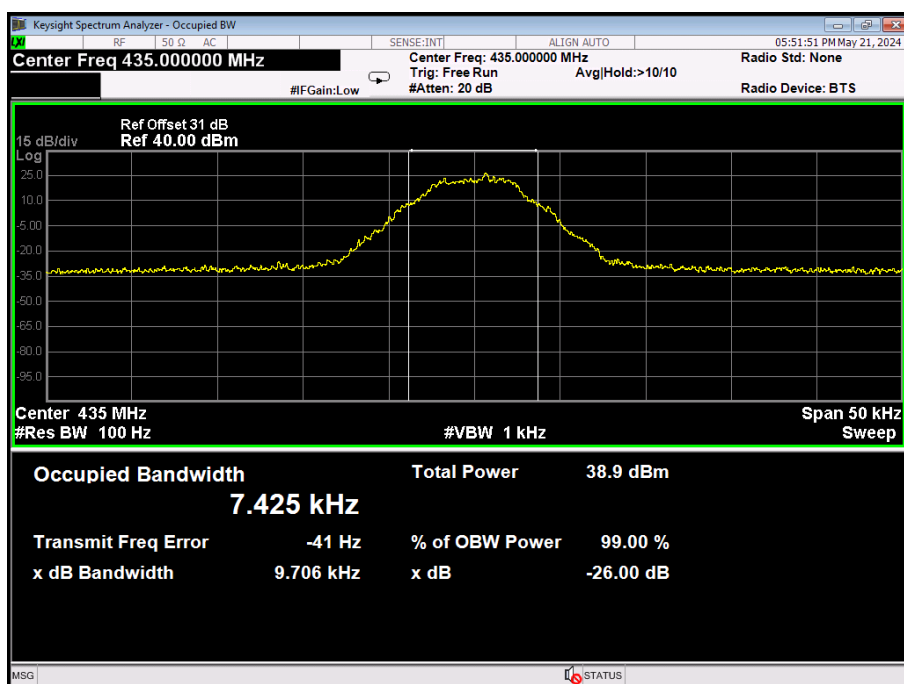
4FSK Modulation

CH1

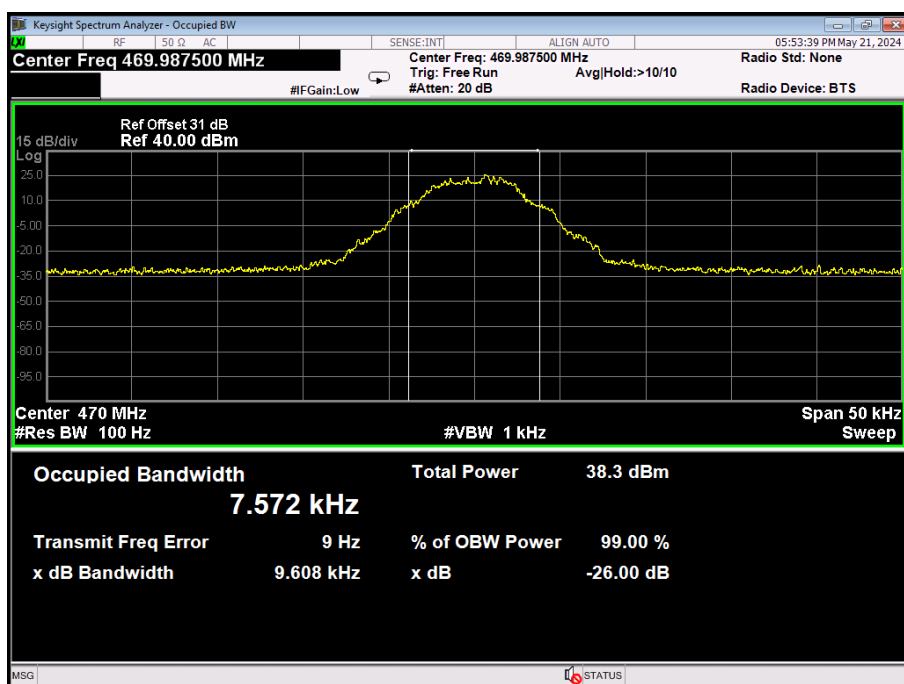




CH2



CH3





5. EMISSION MASK

5.1 PROVISIONS APPLICABLE

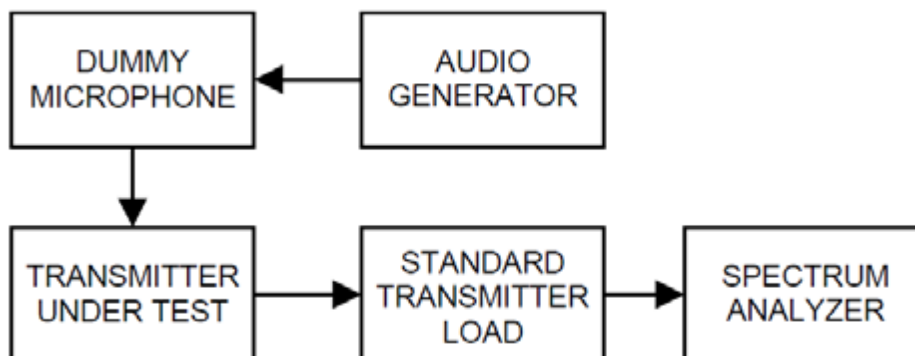
Emission Mask D, 12.5 kHz channel bandwidth equipment: For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- (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 or authorized bandwidth: At least $43 + 10 \log(P)$ dB.

5.2 TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer through sufficient attenuation.
2. The EUT was modulated by 2.5KHz Sine wave audio signal; the level of the audio signal employed is 16dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5kHz (12.5kHz channel spacing) and 5kHz (25kHz channel spacing)
3. Set EUT as normal operation.
4. Set SPA Center Frequency=fundamental frequency, RBW=100Hz, VBW=1KHz, span =100KHz.

5.3 TEST SETUP

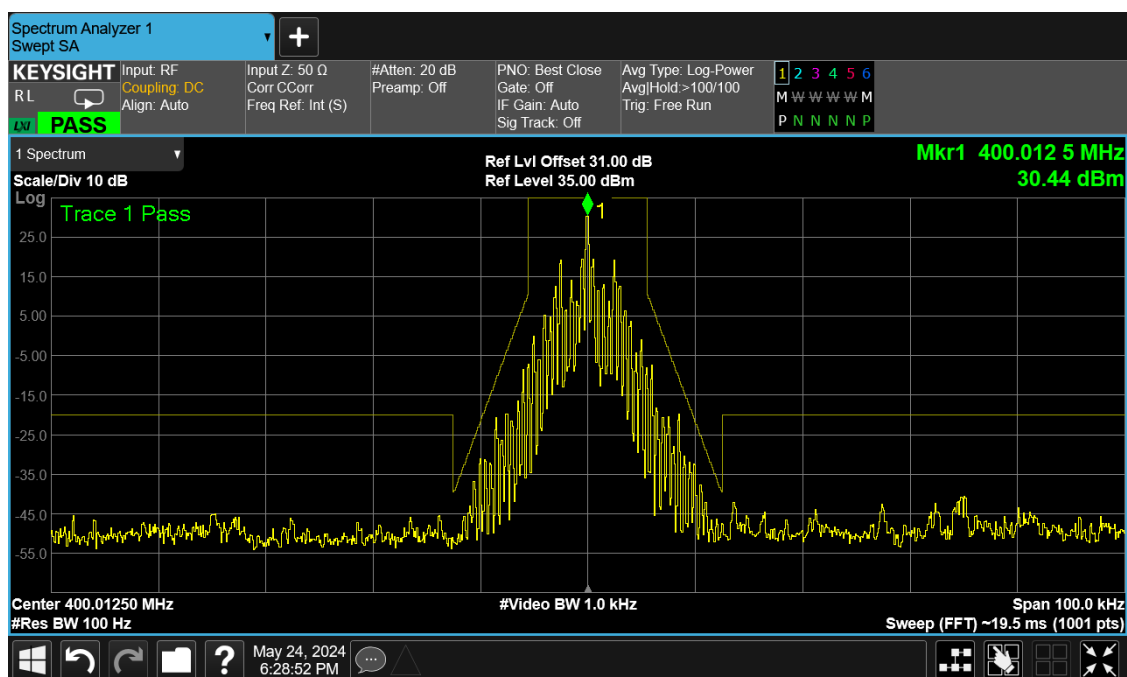




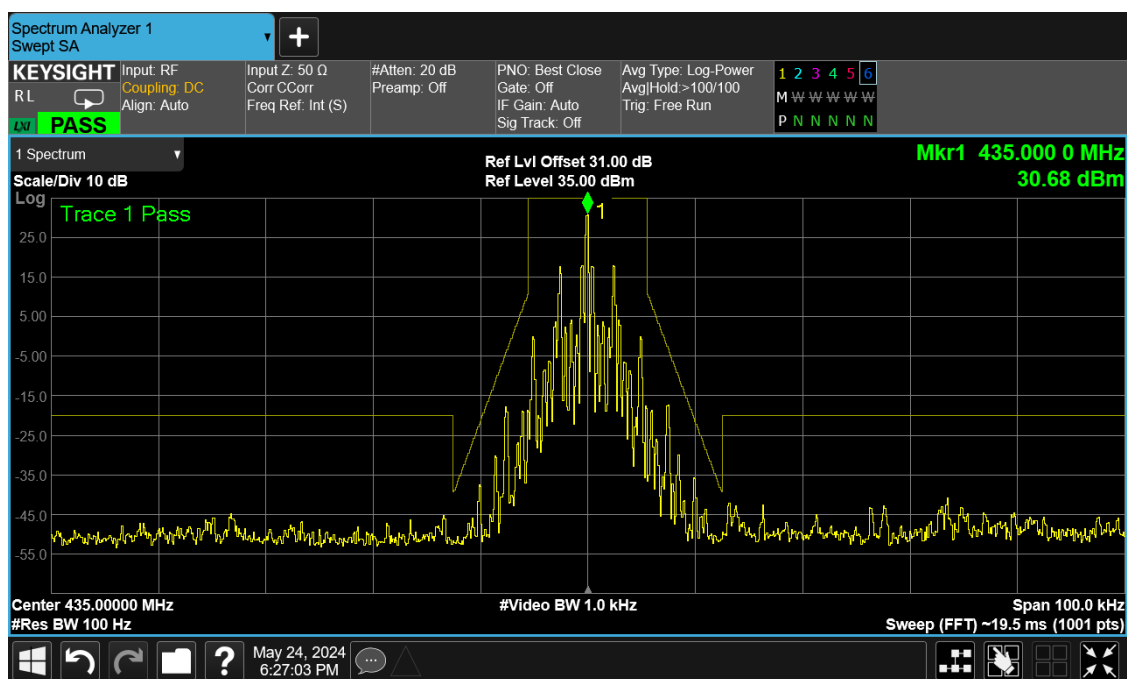
5.5 TEST RESULTS

FM Modulation

CH1

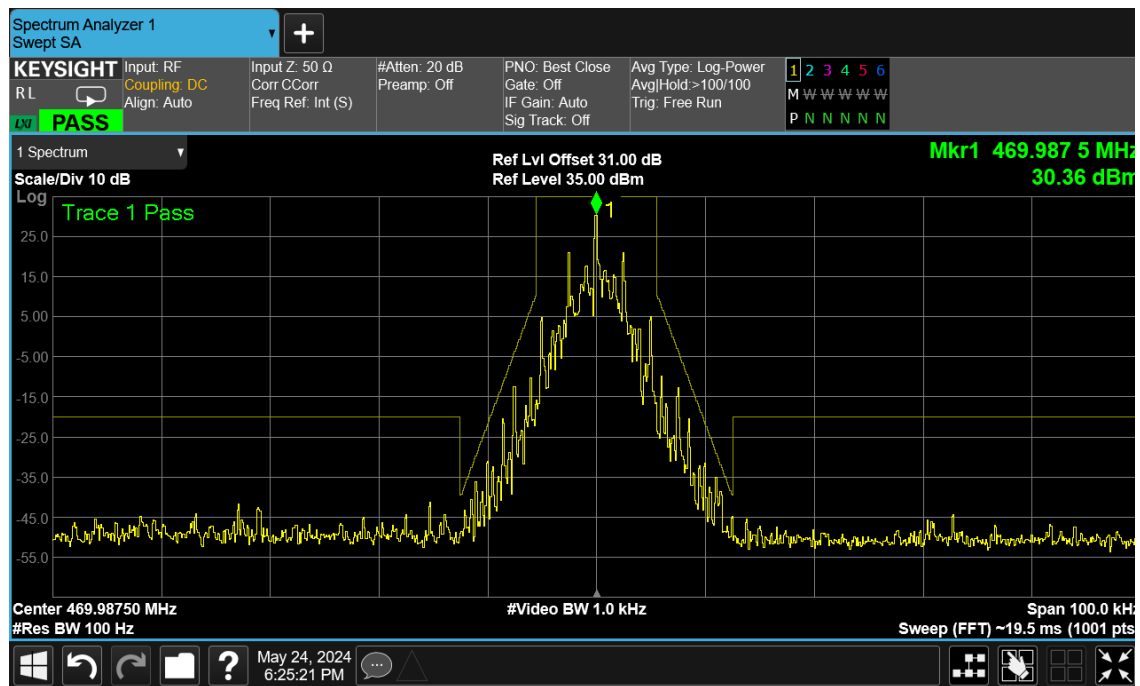


CH2



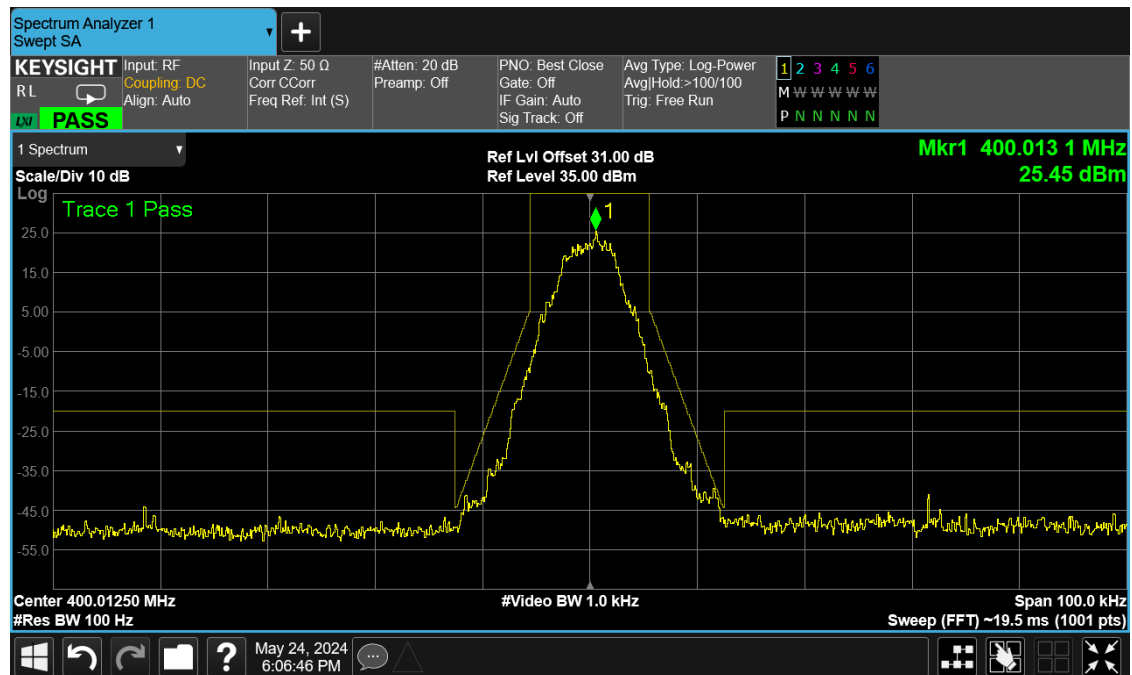


CH3



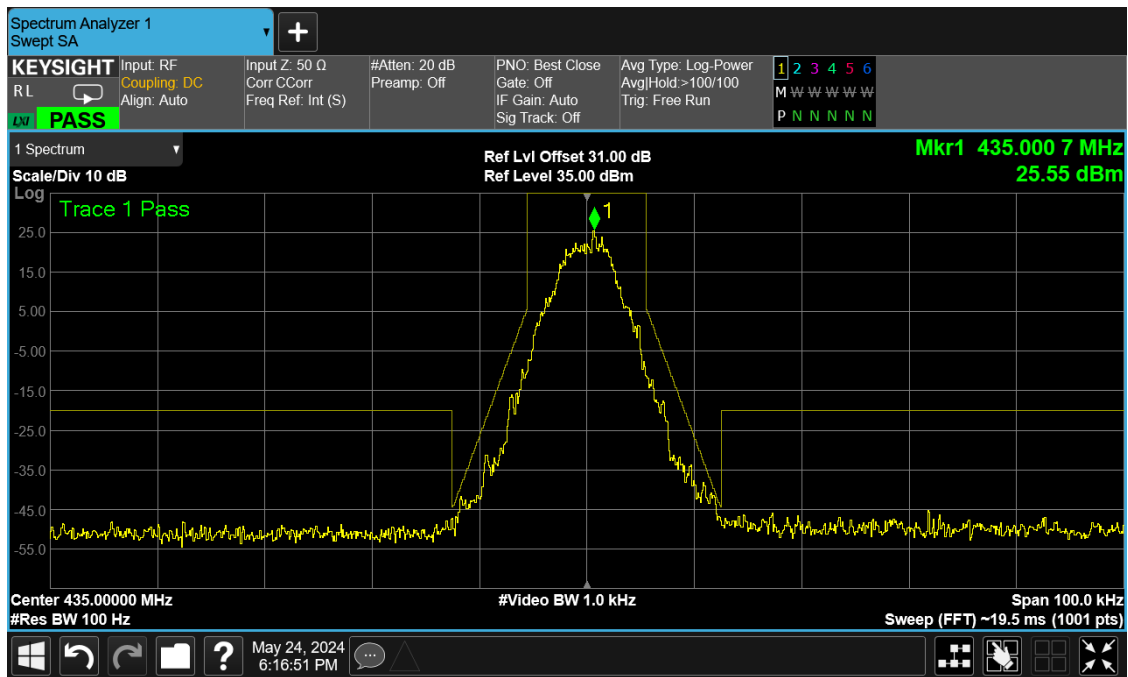
4FSK Modulation

CH1

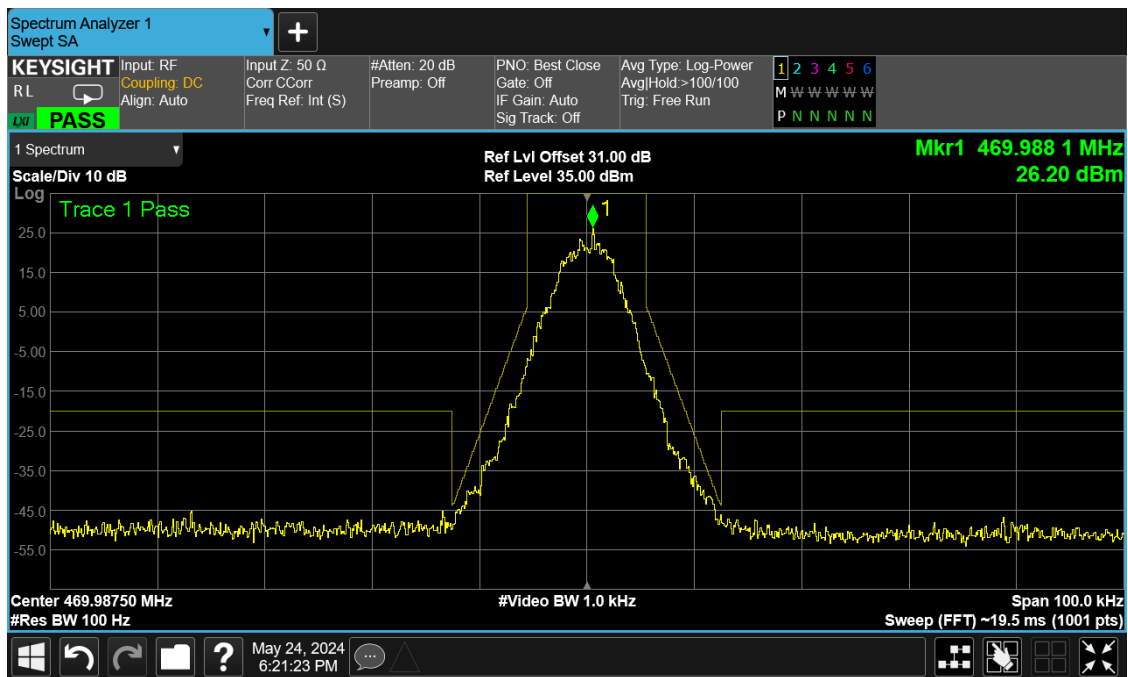




CH2



CH3





6. TRANSMITTER RADIATED SPURIOUS EMISSION

6.1 PROVISIONS APPLICABLE

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:

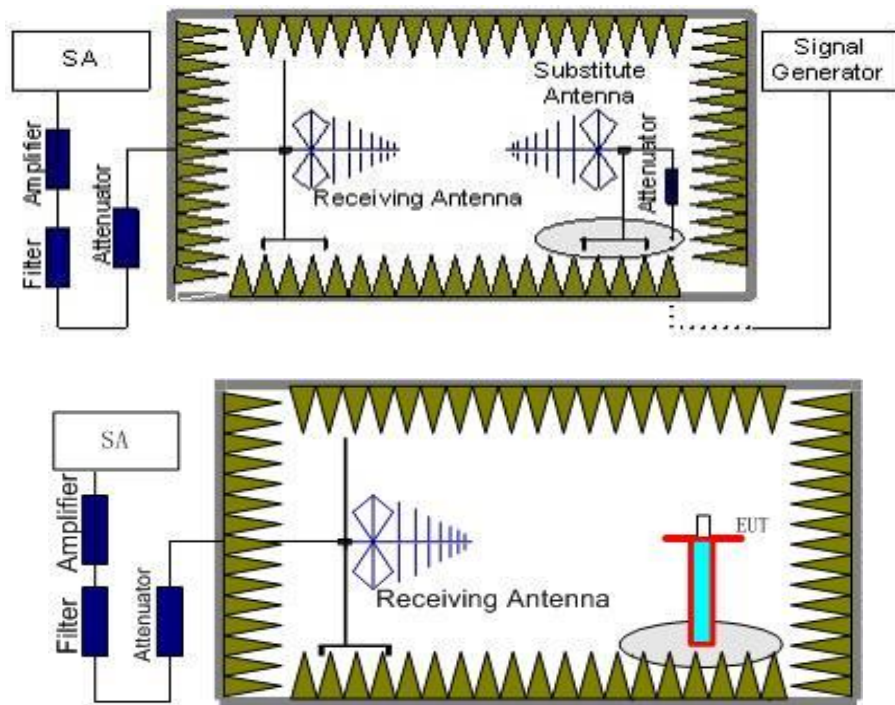
1. On any frequency removed from the center of the authorized bandwidth f_0 to 5.625 KHz removed from f_0 : Zero dB
2. On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in KHz) f_0 of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27dB
3. 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.

6.2 TEST PROCEDURE

The procedure of effective radiated power is as follows:

- a. EUT was placed on a 1.50 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 1.50 m. 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 transmit frequencies in six channels 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 RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100KHz, VBW=300KHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (P_r).
- d. The EUT shall be replaced by a substitution antenna. In the chamber, a 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.
- e. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test. The measurement results are obtained as described below:
Amplifier for substitution test; The measurement results are amend as described below:
Corrected Amplitude = $Mea(dBm) - CF(dB)$

6.3 TEST SETUP





6.4 TEST RESULTS

FM Modulation

Channel 1(400.0125MHz)								
Frequency	Measured Amplitude	Cable	Antenna gain	Corrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna Polar
(MHz)	(dBm)	Loss	(dB)	(dB)	(dBm)	(dBm)	(dB)	(H/V)
801.419	-39.00	4.12	6.2	2.08	-36.92	-20	-16.92	H
801.051	-34.15	4.12	6.2	2.08	-32.07	-20	-12.07	V
1199.684	-44.72	5.81	6.7	0.89	-43.83	-20	-23.83	H
1200.240	-41.07	5.81	6.7	0.89	-40.18	-20	-20.18	V
2001.444	-46.25	7.95	8.3	0.35	-45.90	-20	-25.90	H
2001.397	-44.26	7.95	8.3	0.35	-43.91	-20	-23.91	V

Channel 2(435MHz)								
Frequency	Measured Amplitude	Cable	Antenna gain	Corrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna Polar
(MHz)	(dBm)	Loss	(dB)	(dB)	(dBm)	(dBm)	(dB)	(H/V)
870.074	-41.07	4.12	6.2	2.08	-38.99	-20	-18.99	H
870.050	-43.31	4.12	6.2	2.08	-41.23	-20	-21.23	V
1305.998	-48.28	5.81	6.7	0.89	-47.39	-20	-27.39	H
1305.864	-48.05	5.81	6.7	0.89	-47.16	-20	-27.16	V
2175.904	-46.43	7.95	8.3	0.35	-46.08	-20	-26.08	H
2176.839	-45.98	7.95	8.3	0.35	-45.63	-20	-25.63	V

Channel 3(469.9875MHz)								
Frequency	Measured Amplitude	Cable	Antenna gain	Corrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna Polar
(MHz)	(dBm)	Loss	(dB)	(dB)	(dBm)	(dBm)	(dB)	(H/V)
939.991	-43.50	4.12	6.2	2.08	-41.42	-20	-21.42	H
939.347	-42.28	4.12	6.2	2.08	-40.20	-20	-20.20	V
1410.108	-43.84	5.81	6.7	0.89	-42.95	-20	-22.95	H
1411.081	-43.64	5.81	6.7	0.89	-42.75	-20	-22.75	V
2350.463	-49.92	7.95	8.3	0.35	-49.57	-20	-29.57	H
2349.621	-49.12	7.95	8.3	0.35	-48.77	-20	-28.77	V



4FSK Modulation

Channel 1(400.0125MHz)

Frequency	Measured Amplitude	Cable	Antenna gain	Corrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna
		Loss						Polar
(MHz)	(dBm)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(H/V)
799.732	-37.85	4.12	6.2	2.08	-35.77	-20	-15.77	H
800.368	-33.28	4.12	6.2	2.08	-31.20	-20	-11.20	V
1199.386	-46.17	5.81	6.7	0.89	-45.28	-20	-25.28	H
1200.559	-40.01	5.81	6.7	0.89	-39.12	-20	-19.12	V
1999.453	-43.86	7.95	8.3	0.35	-43.51	-20	-23.51	H
2000.546	-42.95	7.95	8.3	0.35	-42.60	-20	-22.60	V

Channel 2(435MHz)

Frequency	Measured Amplitude	Cable	Antenna gain	Corrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna
		Loss						Polar
(MHz)	(dBm)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(H/V)
870.135	-40.66	4.12	6.2	2.08	-38.58	-20	-18.58	H
869.210	-40.19	4.12	6.2	2.08	-38.11	-20	-18.11	V
1304.864	-45.28	5.81	6.7	0.89	-44.39	-20	-24.39	H
1304.441	-45.27	5.81	6.7	0.89	-44.38	-20	-24.38	V
2175.497	-44.68	7.95	8.3	0.35	-44.33	-20	-24.33	H
2176.872	-45.95	7.95	8.3	0.35	-45.60	-20	-25.60	V

Channel 3(469.9875MHz)

Frequency	Measured Amplitude	Cable	Antenna gain	Corrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna
		Loss						Polar
(MHz)	(dBm)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dB)	(H/V)
941.713	-41.04	4.12	6.2	2.08	-38.96	-20	-18.96	H
942.936	-38.82	4.12	6.2	2.08	-36.74	-20	-16.74	V
1410.890	-41.65	5.81	6.7	0.89	-40.76	-20	-20.76	H
1412.011	-43.36	5.81	6.7	0.89	-42.47	-20	-22.47	V
2349.455	-48.25	7.95	8.3	0.35	-47.90	-20	-27.90	H
2348.667	-46.51	7.95	8.3	0.35	-46.16	-20	-26.16	V

Note: Corrected Amplitude = Mea(dBm) - CF(dB)

Corrected Factor = CL(dB) - AG(dBi)

We were not recorded other points as values lower than limits



7. SPURIOUS EMISSION ON ANTENNA PORT

7.1 LIMIT

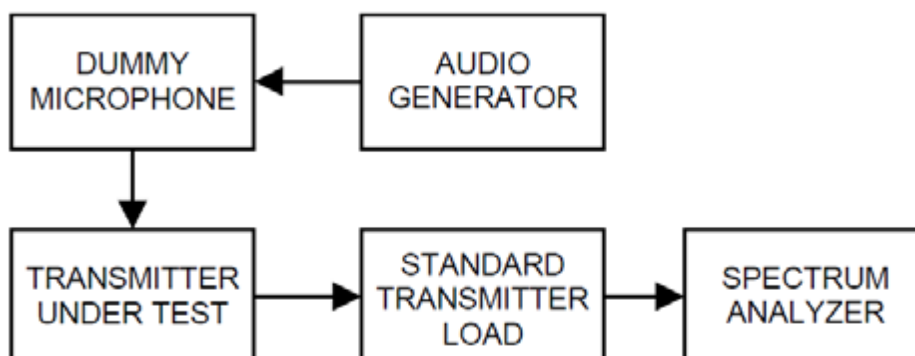
According to the TIA/EIA 603 test method, and according to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

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, which ever is lesser attenuation.

7.2 TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer through sufficient attenuation.
2. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range.
3. Set EUT as normal operation.
4. Set RBW 100kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz, while set RBW=1MHz. VBW=3MHz from the 1GHz to 10th Harmonic.
5. The audio input was set to 0 to get the unmodulated carrier, the resulting picture is print out for each channel separation.

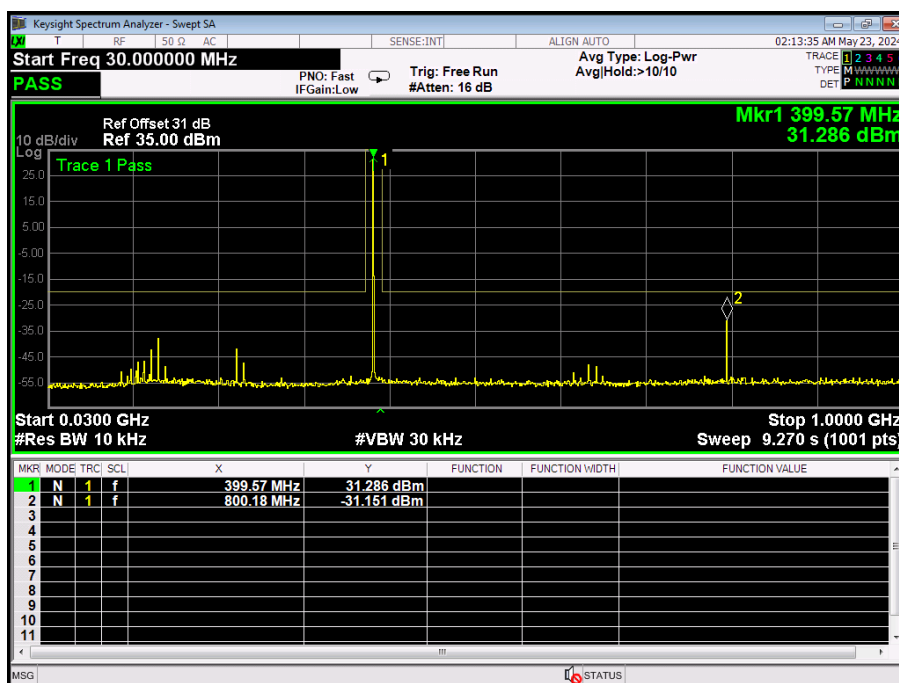
7.3 TEST SETUP



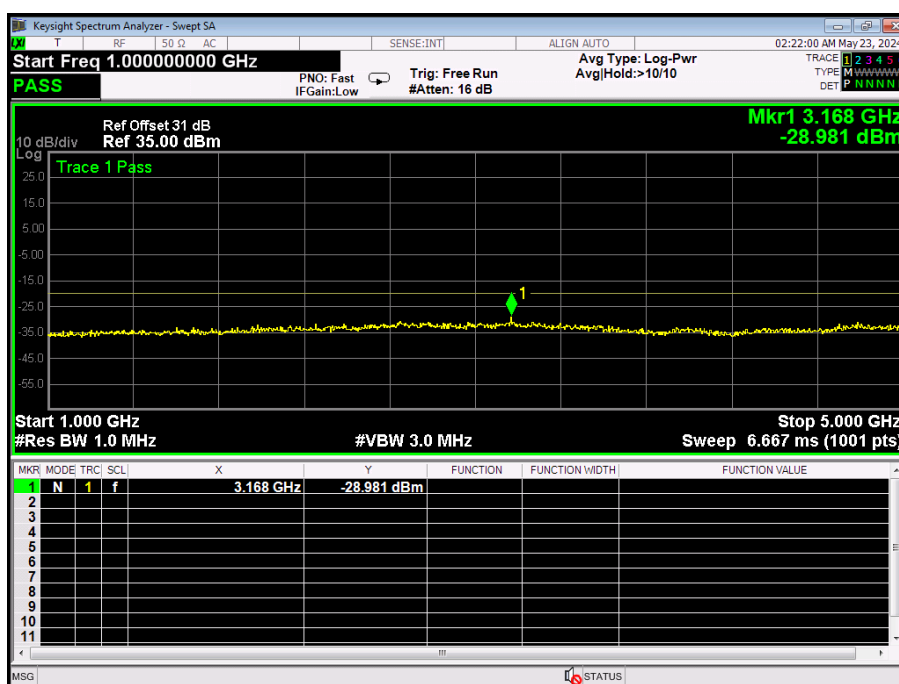


7.4 TEST RESULT

FM Modulation CH1 30MHz-1GHz

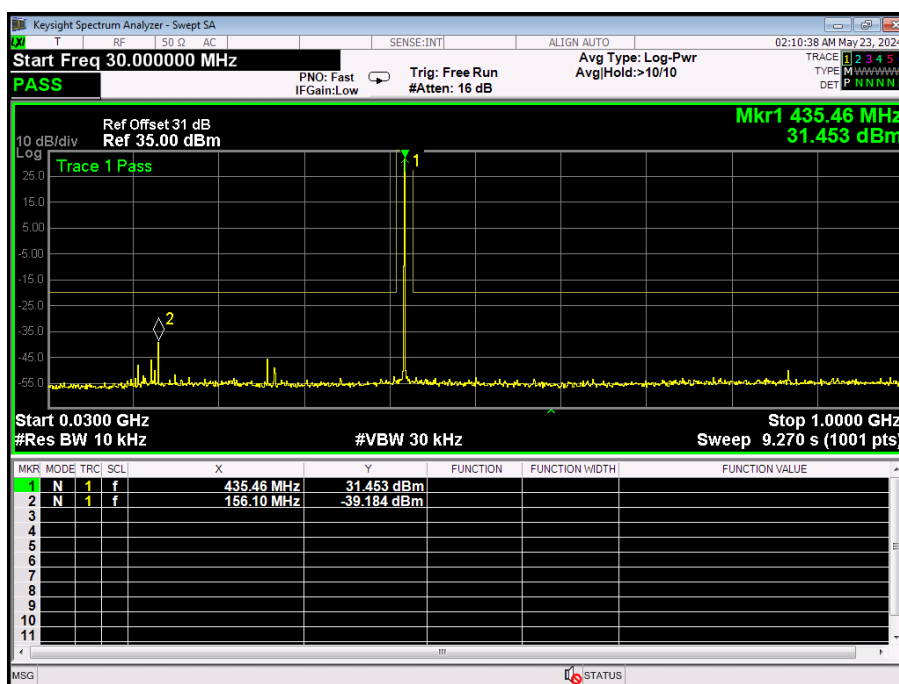


CH1 1GHz-5GHz

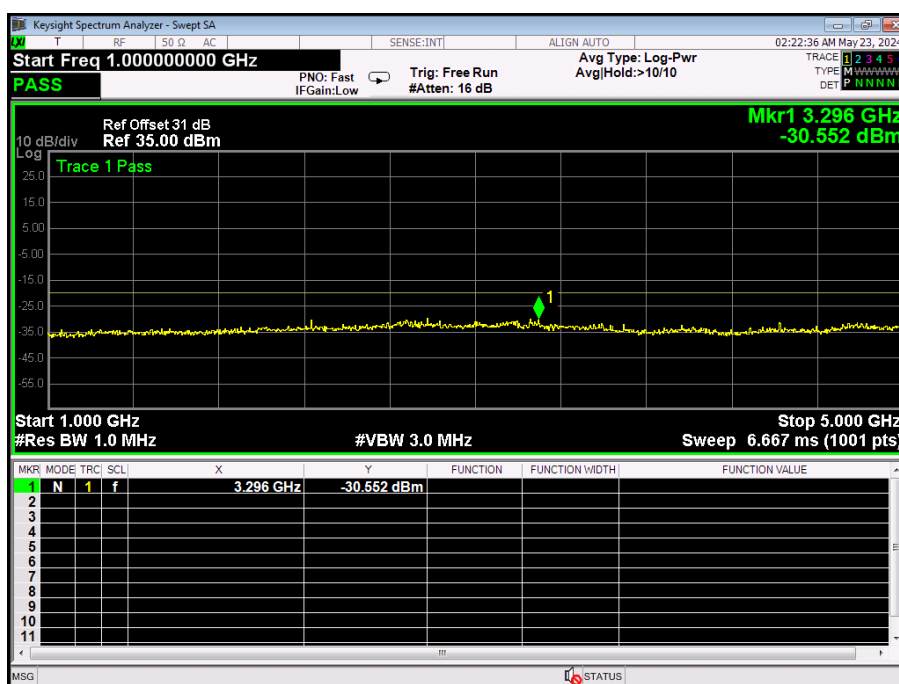




CH2 30MHz-1GHz

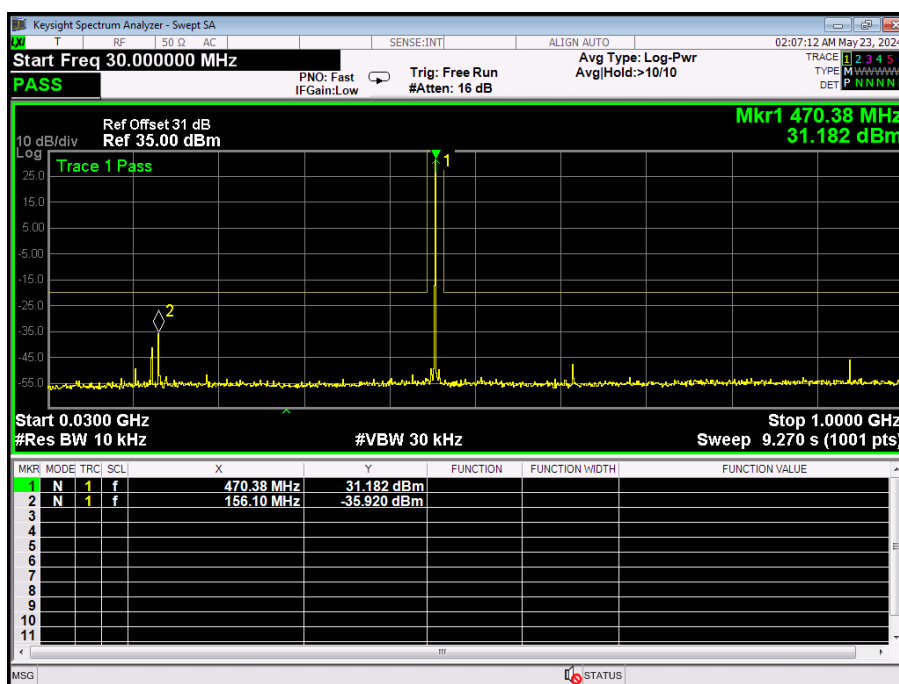


CH2 1GHz-5GHz

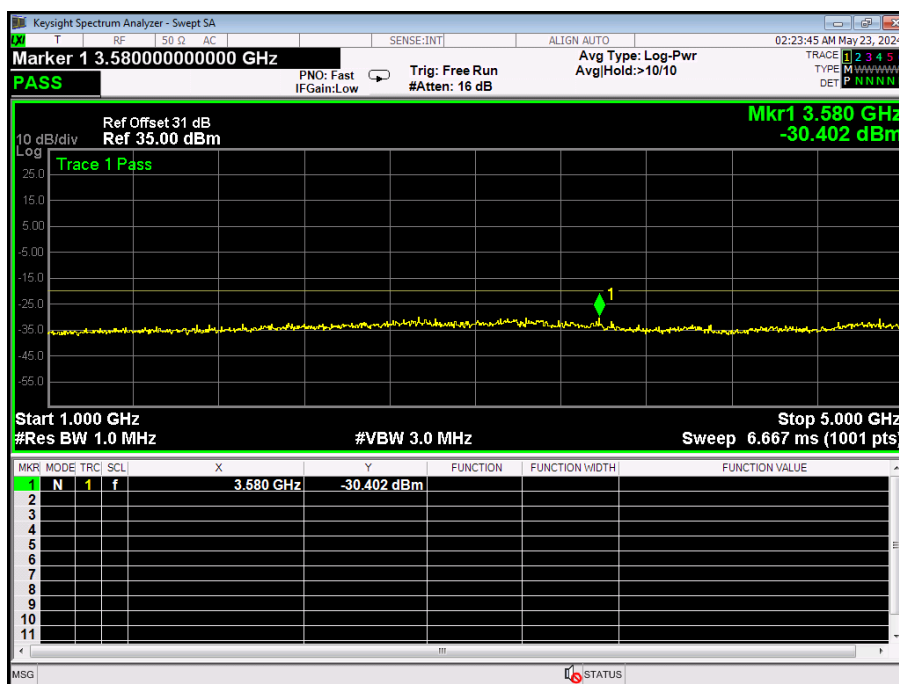




CH3 30MHz-1GHz



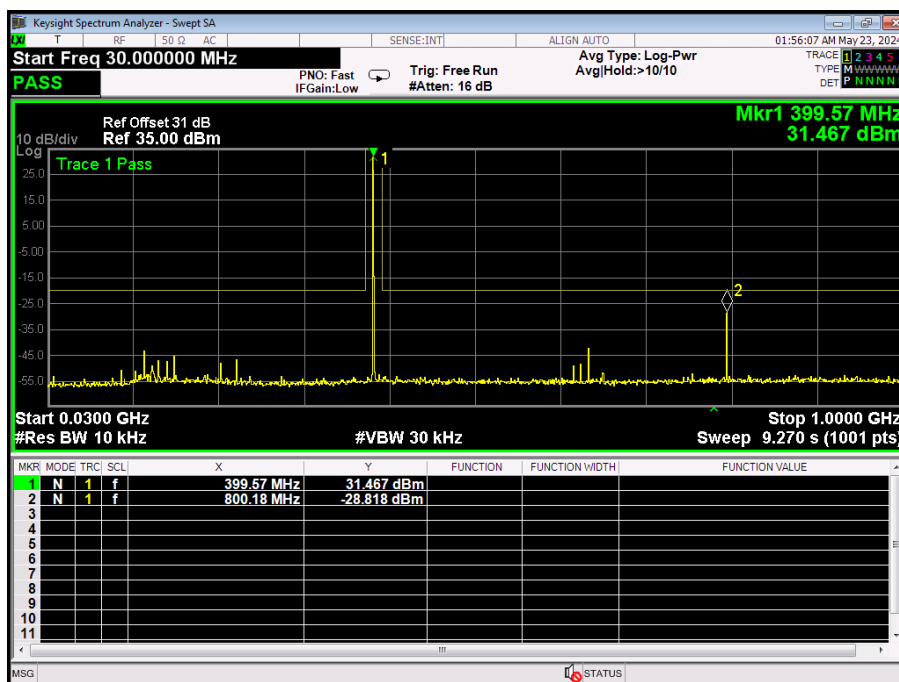
CH3 1GHz-5GHz



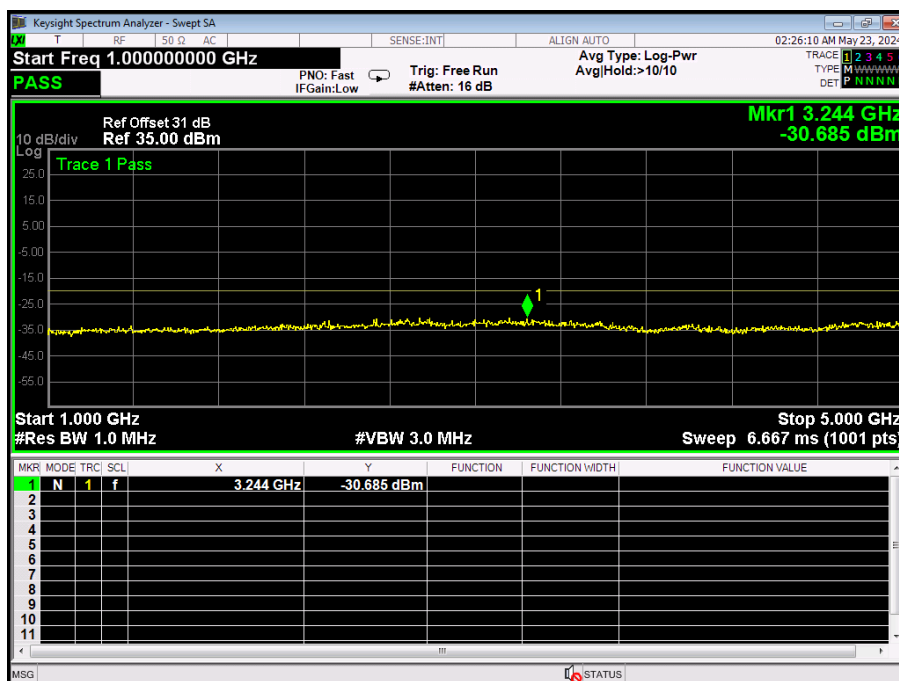


4FSK Modulation

CH1 30MHz-1GHz

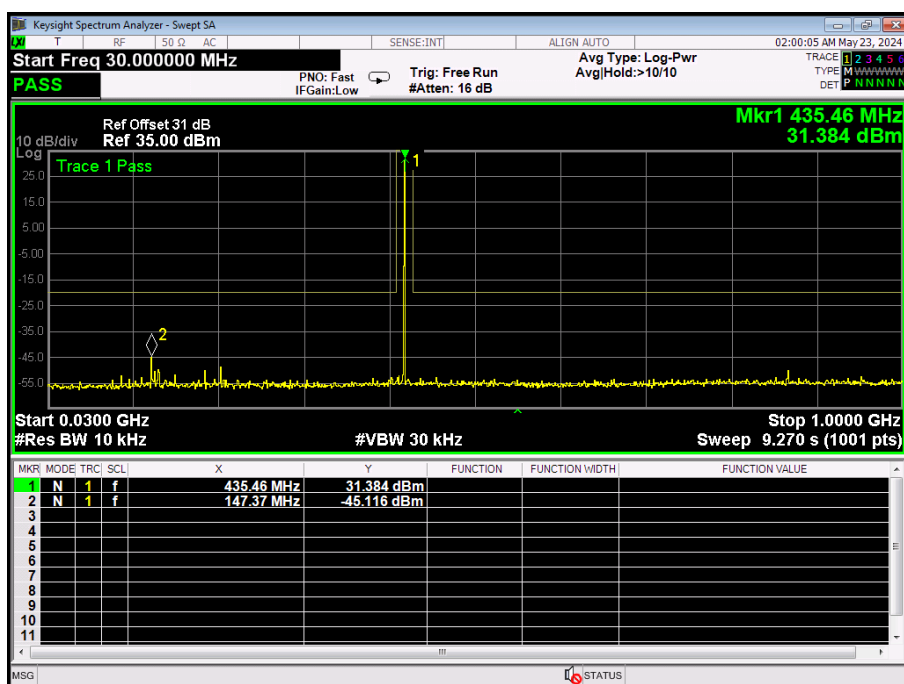


CH1 1GHz-5GHz

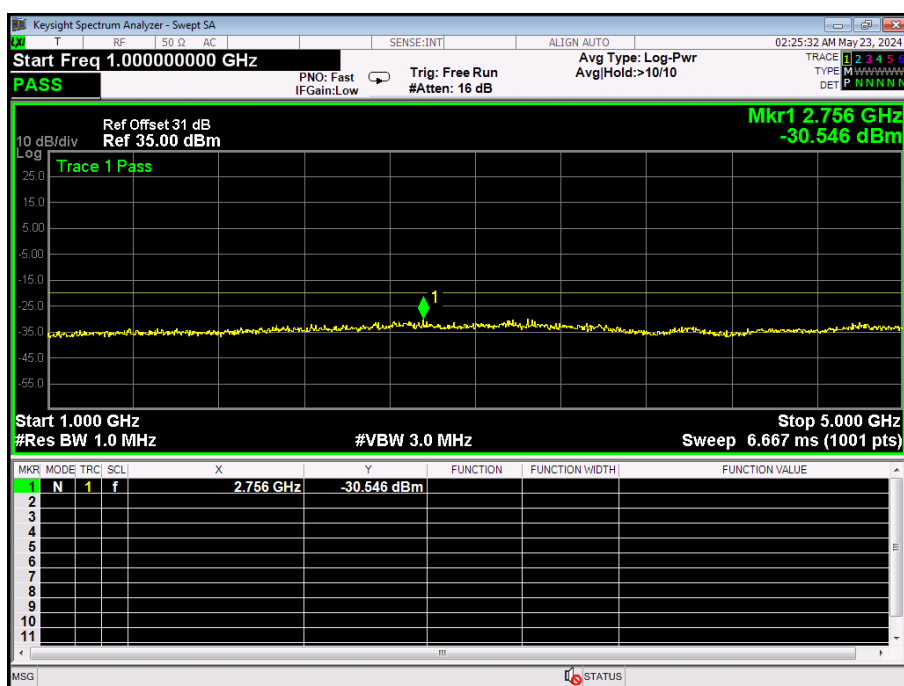




CH2 30MHz-1GHz

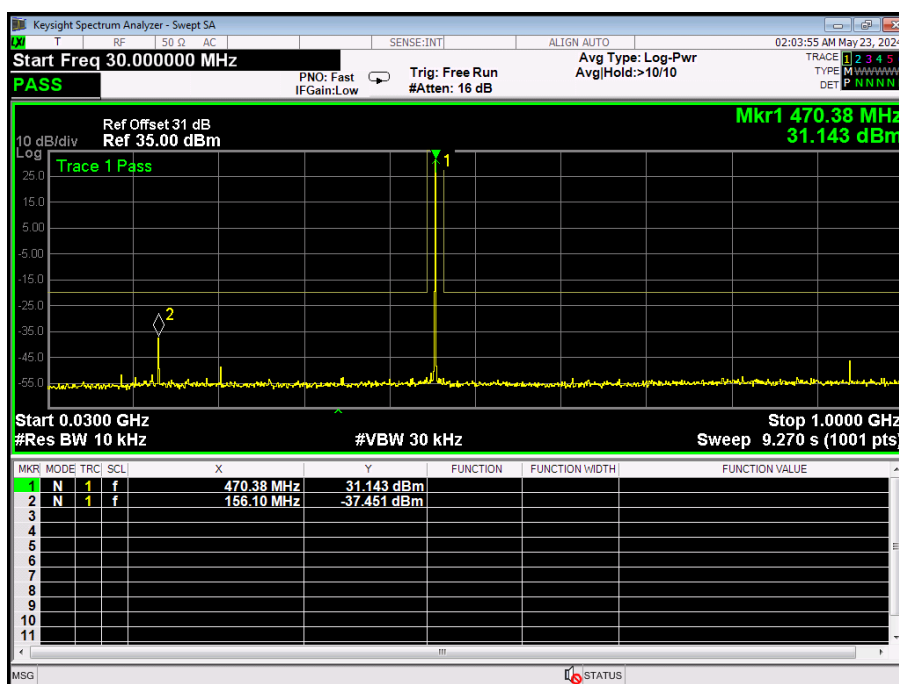


CH2 1GHz-5GHz

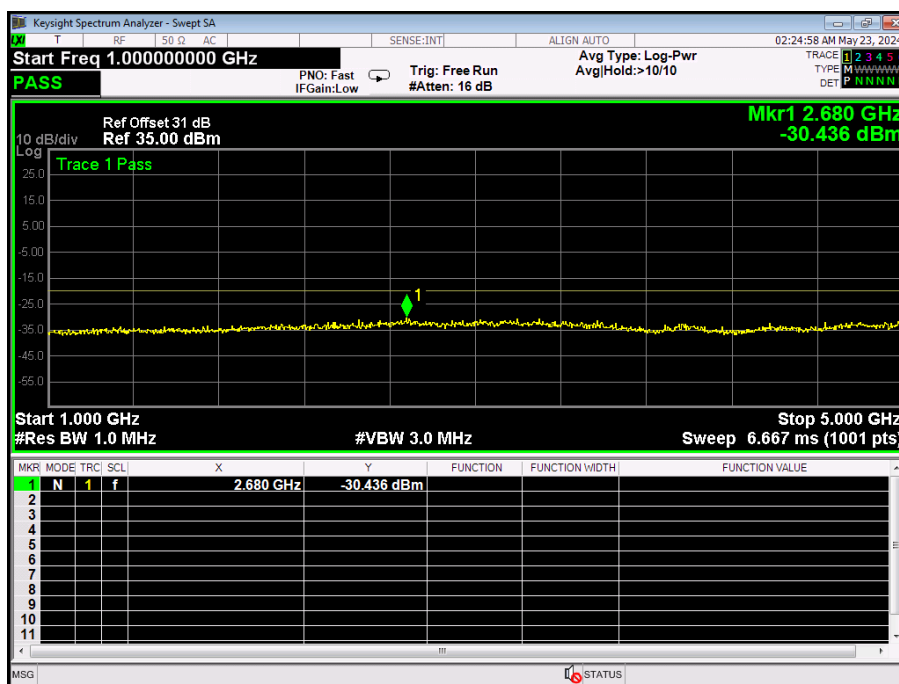




CH3 30MHz-1GHz



CH3 1GHz-5GHz





8. FREQUENCY STABILITY

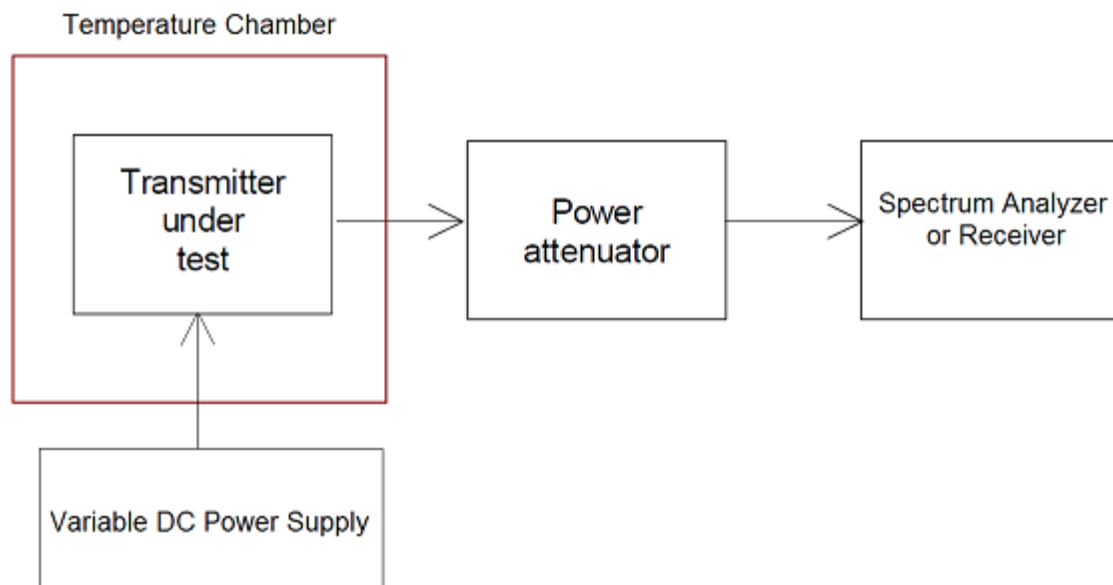
8.1 LIMIT

The carrier frequency stability shall not exceed ± 2.5 ppm.

8.2 TEST PROCEDURE

1. The frequency stability shall be measured with variation of ambient temperature from -30°C to $+50^{\circ}\text{C}$
2. For battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.
3. Vary primary supply voltage from 3.15V to 4.26V.
4. 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

8.3 TEST SETUP



8.4 EUT OPERATION CONDITIONS

TX mode.



8.5 TEST RESULT

FM Modulation

Channel 1						
Temperature (°C)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Deviation (ppm)	Limits	Result
30	Normal Voltage	400.0125	400.01268	0.450	2.5ppm	PASS
-20		400.0125	400.01190	-1.500		
-10		400.0125	400.01209	-1.025		
0		400.0125	400.01201	-1.225		
10		400.0125	400.01276	0.650		
20		400.0125	400.01166	-2.100		
30		400.0125	400.01231	-0.475		
40		400.0125	400.01259	0.225		
50		400.0125	400.01248	-0.050		
20	Maximum Voltage	400.0125	400.01297	1.175		
20	BEP	400.0125	400.01251	0.025		

Channel 2						
Temperature (°C)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Deviation (ppm)	Limits	Result
30	Normal Voltage	435.0000	435.00003	0.069	2.5ppm	PASS
-20		435.0000	435.00041	0.943		
-10		435.0000	435.00030	0.690		
0		435.0000	434.99968	-0.736		
10		435.0000	435.00016	0.368		
20		435.0000	435.00020	0.460		
30		435.0000	435.00028	0.644		
40		435.0000	434.99991	-0.207		
50		435.0000	434.99993	-0.161		
20	Maximum Voltage	435.0000	434.99976	-0.552		
20	BEP	435.0000	435.00034	0.782		



Channel 3						
Temperature (°C)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Deviation (ppm)	Limits	Result
30	Normal Voltage	469.9875	469.98685	-1.383	2.5ppm	PASS
-20		469.9875	469.98762	0.255		
-10		469.9875	469.98692	-1.234		
0		469.9875	469.98755	0.106		
10		469.9875	469.98801	1.085		
20		469.9875	469.98685	-1.383		
30		469.9875	469.98757	0.149		
40		469.9875	469.98751	0.021		
50		469.9875	469.98824	1.575		
20	Maximum Voltage	469.9875	469.98724	-0.553		
20	BEP	469.9875	469.98828	1.660		

4FSK Modulation

Channel 1						
Temperature (°C)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Deviation (ppm)	Limits	Result
30	Normal Voltage	400.0125	400.01245	-0.125	2.5ppm	PASS
-20		400.0125	400.01232	-0.450		
-10		400.0125	400.01236	-0.350		
0		400.0125	400.01223	-0.675		
10		400.0125	400.01195	-1.375		
20		400.0125	400.01286	0.900		
30		400.0125	400.01277	0.675		
40		400.0125	400.01223	-0.675		
50		400.0125	400.01179	-1.775		
20	Maximum Voltage	400.0125	400.01276	0.650		
20	BEP	400.0125	400.01249	-0.025		



Channel 2						
Temperature (°C)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Deviation (ppm)	Limits	Result
30	Normal Voltage	435.0000	434.99982	-0.414	2.5ppm	PASS
-20		435.0000	434.99960	-0.920		
-10		435.0000	435.00058	1.333		
0		435.0000	435.00074	1.701		
10		435.0000	435.00042	0.966		
20		435.0000	434.99940	-1.379		
30		435.0000	435.00030	0.690		
40		435.0000	435.00052	1.195		
50		435.0000	435.00031	0.713		
20	Maximum Voltage	435.0000	434.99998	-0.046	2.5ppm	PASS
20	BEP	435.0000	434.99963	-0.851		

Channel 3						
Temperature (°C)	Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Deviation (ppm)	Limits	Result
30	Normal Voltage	469.9875	469.98718	-0.681	2.5ppm	PASS
-20		469.9875	469.98798	1.021		
-10		469.9875	469.98762	0.255		
0		469.9875	469.98791	0.872		
10		469.9875	469.98757	0.149		
20		469.9875	469.98711	-0.830		
30		469.9875	469.98804	1.149		
40		469.9875	469.98768	0.383		
50		469.9875	469.98759	0.191		
20	Maximum Voltage	469.9875	469.98779	0.617	2.5ppm	PASS
20	BEP	469.9875	469.98757	0.149		



9. MODULATION CHARACTERISTIC

9.1 LIMIT

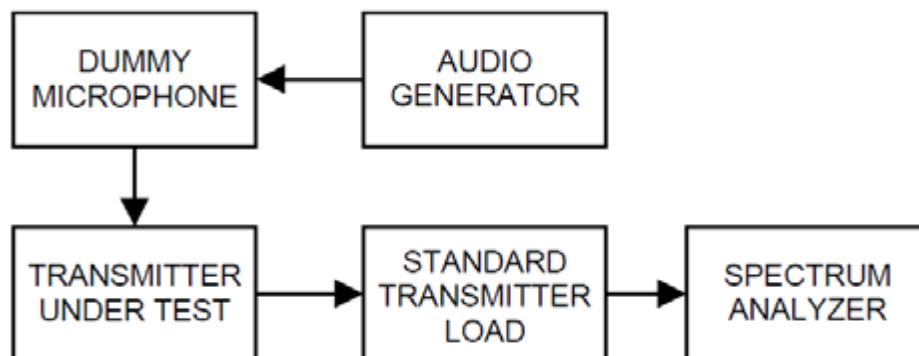
FCC Part 2.1047

- (a) Equipment which utilizes voice modulated communication show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. 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.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

9.2 TEST PROCEDURE

The test procedure please reference TIA 603-E 2.2.3.

9.3 TEST SETUP



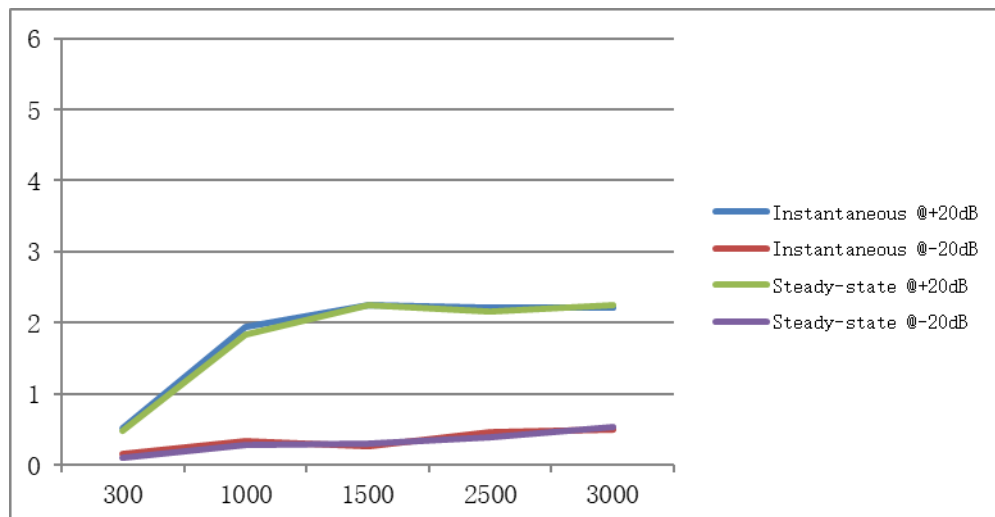


9.4 TEST RESULT

Note: All mode has been tested, only shown the worst case in this report.

MODULATION LIMIT:

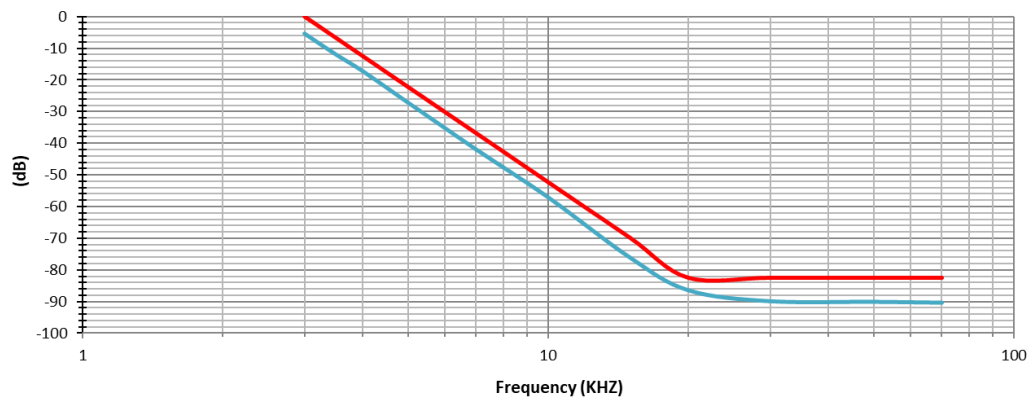
4FSK Modulation-Channel 1						
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit (kHz)	Result
	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)		
300	0.517	0.149	0.481	0.102	±2.5	Pass
1000	1.95	0.333	1.84	0.285		
1500	2.242	0.262	2.249	0.295		
2500	2.217	0.464	2.164	0.397		
3000	2.218	0.49	2.256	0.534		





AUDIO LOW PASS FILTER RESPONSE:

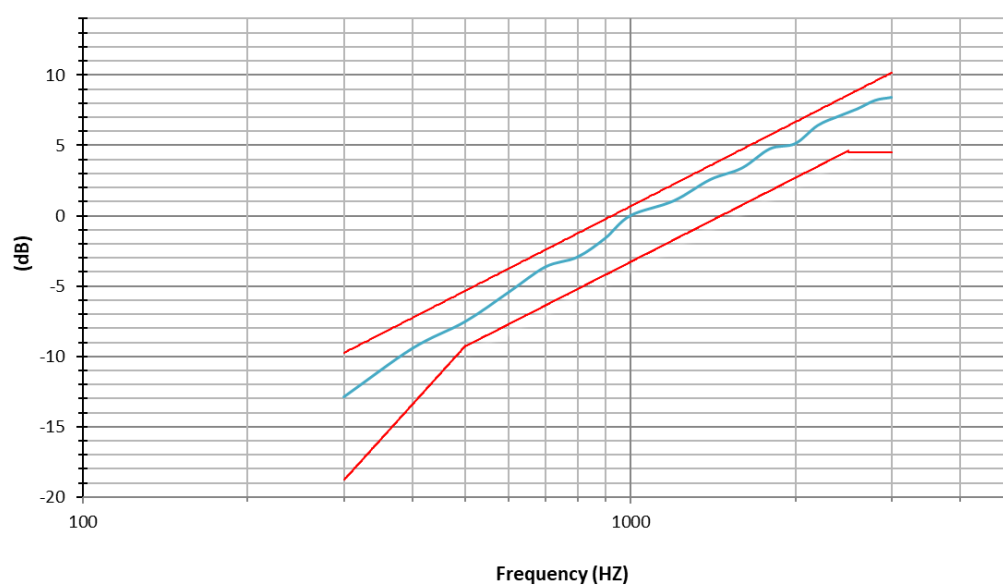
4FSK Modulation-Channel 1			
Audio Frequency(KHz)	Limit	Response Attenuation(dB)	Result
3	0	-5.32	PASS
3.5	-6.7	-11.89	
4	-12.5	-17.20	
5	-22.2	-27.12	
7	-36.8	-41.93	
10	-52.3	-57.12	
15	-69.9	-76.23	
20	-82.5	-86.55	
30	-82.5	-90.00	
50	-82.5	-90.20	
70	-82.5	-90.46	





AUDIO FREQUENCY RESPONSE:

4FSK Modulation-Channel 1		
Audio Frequency(Hz)	Audio Frequency Response(dB)	Result
300	-12.85	PASS
400	-9.41	
500	-7.50	
600	-5.42	
700	-3.63	
800	-2.94	
900	-1.60	
1000	0.00	
1200	1.05	
1400	2.56	
1600	3.38	
1800	4.75	
2000	5.11	
2200	6.4	
2400	7.05	
2600	7.58	
2800	8.18	
3000	8.39	





10. TRANSMITTER FREQUENCY BEHAVIOR

10.1 LIMIT

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

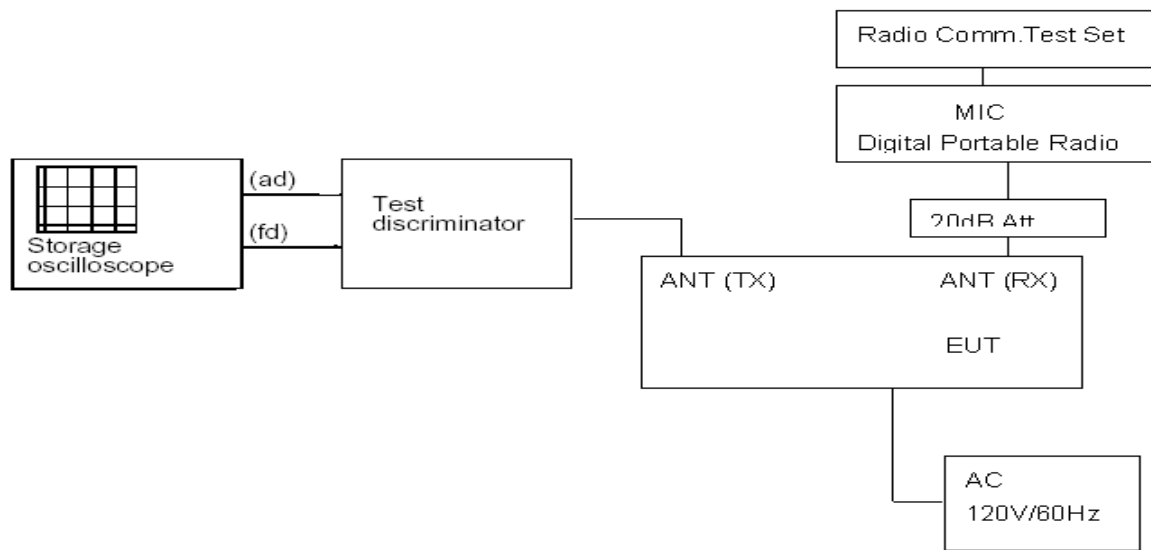
1. t_{on} is the instant when a 1 KHz test signal is completely suppressed, including any capture time due to phasing.
t₁ is the time period immediately following t_{on}.
t₂ is the time period immediately following t₁.
t₃ is the time period from the instant when the transmitter is turned off until t_{off}.
t_{off} is the instant when the 1 KHz test signal starts to rise.
2. During the time from the end of t₂ to the beginning of t₃, the frequency difference must not exceed the limits specified in § 90.213.
3. Difference between the actual transmitter frequency and the assigned transmitter frequency.
4. 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.

10.2 TEST PROCEDURE

- a. Use Digital portable radio which manufactured by VictelGlobal Communications Corporation Limited which uses same protocol as the DUT connect to RX antenna by 20Att in order to avoid damaging DUT;
- b. Connect DUT into Test discriminator and Storage Oscilloscope and keep DUT stats ON;
- c. Inut 1KHz signal into digital portable radio;
- d Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signals;
- e Keep the digital protable radio in OFF state and Key the PTT of digital portable radio;
- f Observe the stored oscilloscope of modulation domain analyzer. The signal trace shall be maintained within the allowable limits during the periods t₁ and t₂, and shall also remain within limits following t₂;
- g Adjust the modulation domain anzlyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transmitter of the transmitter signal.
- h Keep the digital portable radio in ON state and Unkey the PTT of digital portable radio;
- i Observe the stored oscilloscope of modulation domain analyzer. The signal trace shall be maintained within the allowable limits during the period t₃



10.3 TEST SETUP

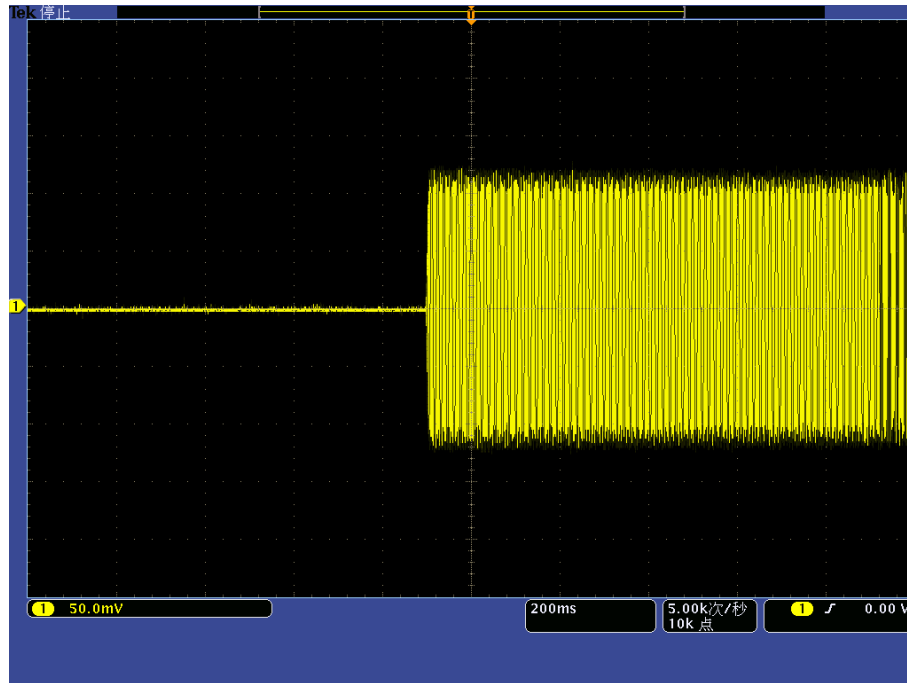




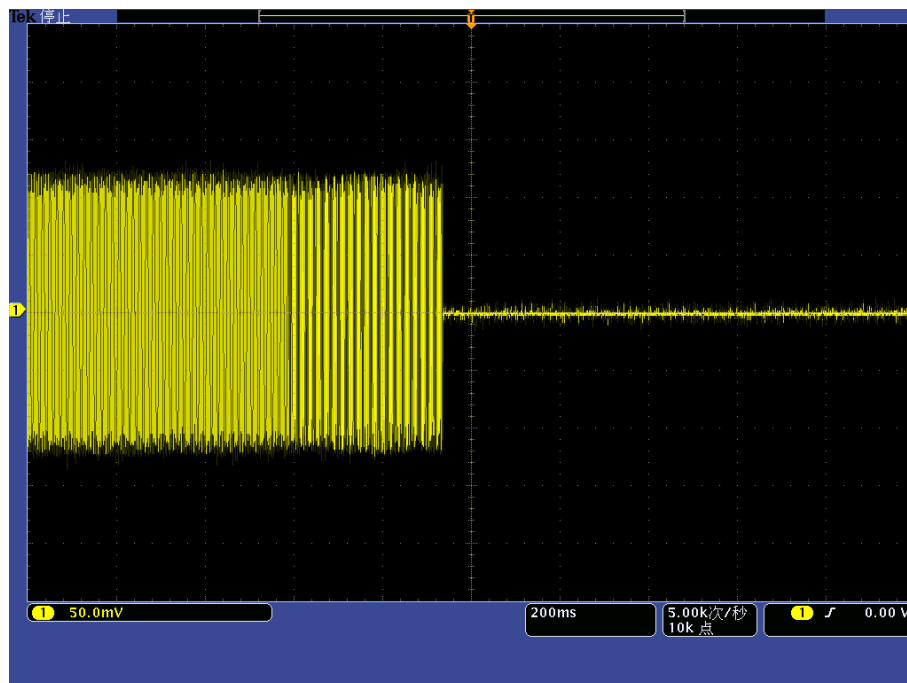
10.4 TEST RESULT

Note: All mode has been tested, only shown the worst case in this report.

Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation-----Off – On



Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation-----On – Off





APPENDIX I - PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Note: Please see the attached BN500_External Photos and BN500_Internal Photos.

※※※※※END OF THE REPORT※※※※※