



FCC TEST REPORT

Report No:STS1803196W01

Issued for

Guangdong Samzuk Technology Development Co,Ltd

High-Tech Zone Xinggong Avenue East Heyuan, China

Product Name:	Walkie talkie
Brand Name:	SAMCOM
Model Name:	FPCN30AA
Series Model:	FPCN30AB,FPCN30AC,FPCN30AD, FPCN30AE,FPCN30AF,FPCN30AG, FPCN30AH,FPCN30AI.
FCC ID:	2AIOQ-FPCN30AA
Test Standard:	FCC Part 90 Rules

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TEST RESULT CERTIFICATION

Applicant's name..... Guangdong Samzuk Technology Development Co,Ltd

Address High-Tech Zone Xingong Avenue East Heyuan, China

Manufacture's Name Guangdong Samzuk Technology Development Co,Ltd

Address High-Tech Zone Xingong Avenue East Heyuan, China

Product description

Product Name Walkie talkie

Brand Name **SAMCOM**

Model Name..... FPCN30AA

Series Model FPCN30AB,FPCN30AC,FPCN30AD,FPCN30AE,FPCN30AF,
FPCN30AG,FPCN30AH,FPCN30AI.

Test Standards FCC Part 90 Rules

Test procedure..... C63.26-2015

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date of performance of tests 20 Mar. 2018 ~09 Apr. 2018

Date of Issue 09 Apr. 2018

Test Result..... Pass

Testing Engineer :

(Chris chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	09 Apr. 2018	STS1803196W01	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Emission			
Standard	Item	Result	Remarks
FCC Part 90.205	Maximum Transmitter Power	PASS	
FCC Part 90.209	Occupied Bandwidth	PASS	
FCC Part 90.210	Emission Mask	PASS	
FCC Part 90.210	Transmitter Radiated Spurious Emssion	PASS	
FCC Part 90.210	Spurious Emssion on Antenna Port	PASS	
FCC Part 90.213	Frequency Stability Test	PASS	
FCC Part 90.210	Transmitter Frequency Behavior	PASS	
FCC Part 2.1047	Modulation Characteristic	PASS	

NOTE:

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



1.1 TEST FACILITY

Shenzhen STS Test Services Co., Ltd.

Add.: 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China.

CNAS Registration No.: L7649; FCC Registration No.: 625569

IC Registration No.: 12108A; A2LA Certificate No.: 4338.01;

1.2 MEASUREMENT UNCERTAINTY

The reported 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 % .

No.	Item	Uncertainty
1	RF power,conducted	$\pm 0.70\text{dB}$
2	Spurious emissions,conducted	$\pm 1.19\text{dB}$
3	Spurious emissions,radiated($>1\text{G}$)	$\pm 2.83\text{dB}$
4	Spurious emissions,radiated($<1\text{G}$)	$\pm 3.01\text{dB}$
5	Temperature	$\pm 0.5^{\circ}\text{C}$
6	Humidity	$\pm 2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Walkie talkie
Brand Name:	SAMCOM
Model Name:	FPCN30AA
Series Model:	FPCN30AB,FPCN30AC,FPCN30AD,FPCN30AE, FPCN30AF,FPCN30AG,FPCN30AH,FPCN30AI.
Model Difference description:	Only different model names, colors and appearance
Operation Frequency Range	Frequency Range: 406.1MHz ~ 470MHz
Maximum Transmitter Power:	dBm
Channel Separation:	12.5KHz and 25.0KHz
Modulation type:	FM
Adapter	Power supply and ADP(rating): Input: AC 100V-240V, 50~60Hz, 200mA Output: DC 12.00V, 500mA
Battery	Battery(rating): Rated Voltage: 7.4V Charge Limit: 8.4V Capacity :1500mAh
Temperature Range:	-20℃-60℃
Test frequency list:	See Note 5
Software version number:	V 1.4
Hardware version number:	Ver A3

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Note: The product has the same digital working characters when operating in both two digitized voice/data mode. So only one set of test results for digital modulation modes are provided in this test report.
3. Please refer to Appendix B for the photographs of the EUT. For more details, please refer to the User's manual of the EUT.



4. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	SAMCOM	FPCN30AA	Whip Antenna	N/A	1.0	Antenna

The EUT antenna is External Antenna. No antenna other than that furnished by the responsible party shall be used with the device.

5. Test frequency list

Channel Separation	Test Channel	Test Frequency (MHz)
12.5kHz	CH1	406.1125
	CH2	453.0125
	CH3	469.9875

Channel Separation	Test Channel	Test Frequency (MHz)
25kHz	CH1	406.125
	CH2	453.025
	CH3	469.975

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above listed frequency for testing.



2.2 EUT OPERATION MODE

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements..

2.3 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Final Test Mode	Power level	Channel Separation	Frenquency
Model 1	High rated power	12.5kHz	406.1125
			453.0125
			469.9875
Model 2	Low rated power		406.1125
			453.0125
			469.9875
Model 3	High rated power	25kHz	406.125
			453.025
			469.975
Model 4	Low rated power		406.125
			453.025
			469.975

Model 1:

The equipment is set with FM modulation and 12.5KHz bandwidth at minimum rated power for transmitter,powered by DC 7.4V.

Model 2:

The equipment is set with FM modulation and 12.5KHz bandwidth at maximum rated power for transmitter,powered by DC 7.4V.

Model 3:

The equipment is set with FM modulation and 25.0KHz bandwidth at minimum rated power for transmitter,powered by DC 7.4V.

Model 4:

The equipment is set with FM modulation and 25.0KHz bandwidth at maximum rated power for transmitter,powered by DC 7.4V.

Note:

(1) Due to the different configuration and test, in this list only some worse mode. The worst test data of the worse modeis reported by this report.



2.4 DESCRIPTION OF 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

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.



2.7 TEST EQUIPMENT

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Signal Analyzer	Agilent	N9020A	MY49100060	2017.06.15	2018.06.14
Signal Generator	Agilent	N5182A	MY46240556	2017.10.15	2018.10.14
Audio Generator	TRONSON	TAG-101	20030212	2017.10.15	2018.10.14
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.01	2018.10.30
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2017.10.27	2018.10.26
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2017.10.15	2018.10.14
Pre-mpifier (0.1M-3GHz)	EM	EM330	60538	2018.03.10	2019.03.10
PreAmplifier (1G-26.5GHz)	Agilent	8449B	60538	2017.10.15	2018.10.14
Attenuator	HP	8494B	DC-18G	2017.10.15	2018.10.14
programmable power supply	Agilent	3642A	STS-S095	N.C.R	N.C.R
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Audio analyzer	R&S	UPL	N/A	2017.06.15	2018.06.14
RF COMMUNICATION TEST SET	HP	N8920A	348A05658	2017.10.15	2018.10.14



3. MAXIMUM TRANSMITTER POWER

3.1 LIMITS

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

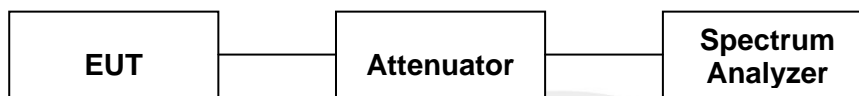
3.2 TEST PROCEDURE

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	Operation Mode	Test Channel	Test Frequency (MHz)	Test Results (dBm)	Test Results (W)
FM	12.5KHz	Mode 1	CH1	406.1125	36.886	4.882
			CH2	453.0125	36.155	4.126
			CH3	469.9875	36.800	4.786
		Mode 2	CH1	406.1125	26.521	0.449
			CH2	453.0125	26.779	0.476
			CH3	469.9875	27.361	0.545

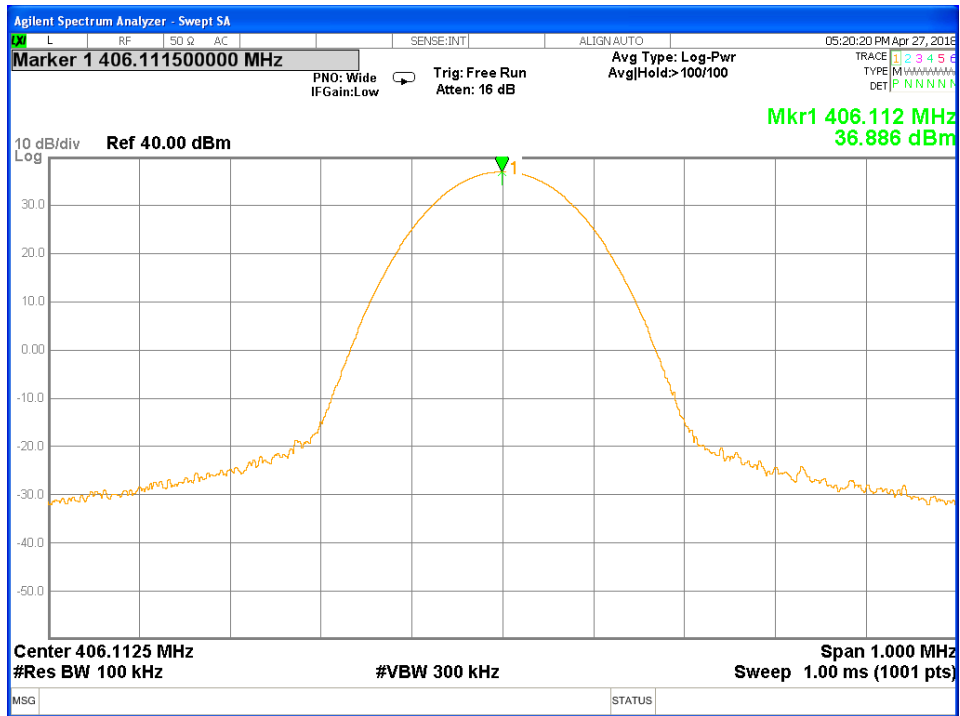
Modulation Type	Channel Sparation	Operation Mode	Test Channel	Test Frequency (MHz)	Test Results (dBm)	Test Results (W)
FM	25KHz	Mode 3	CH1	406.125	36.249	4.216
			CH2	453.025	36.630	4.603
			CH3	469.975	36.617	4.589
		Mode 4	CH1	406.125	26.300	0.427
			CH2	453.025	26.374	0.434
			CH3	469.975	26.113	0.409

Note: The high rated power level is 5W, and low rated power level is 0.5W.



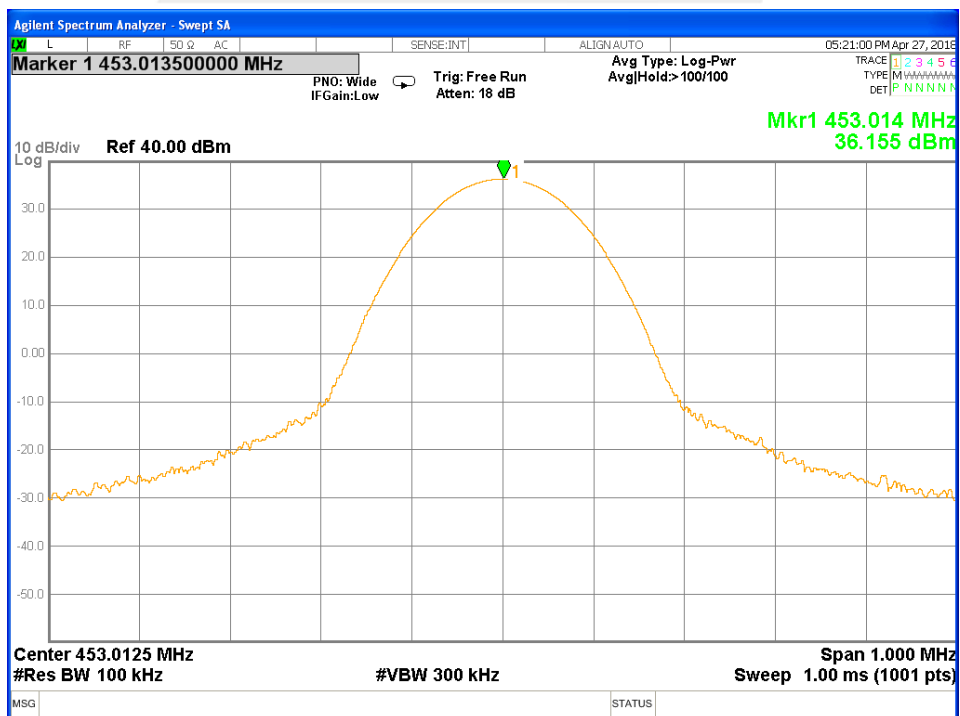
CH 1

Model 1



CH 2

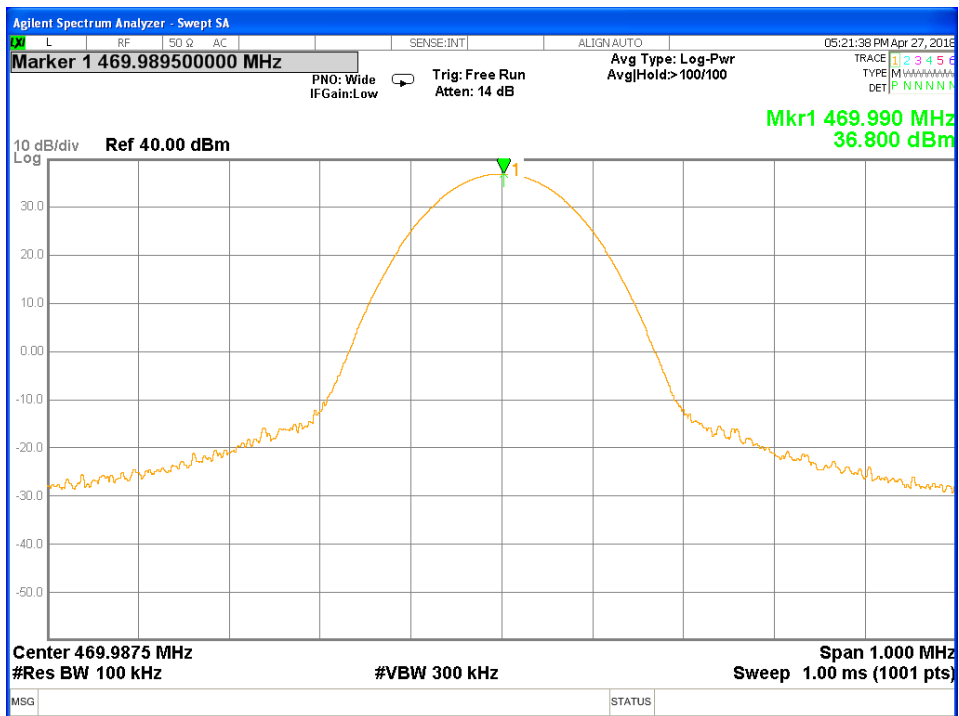
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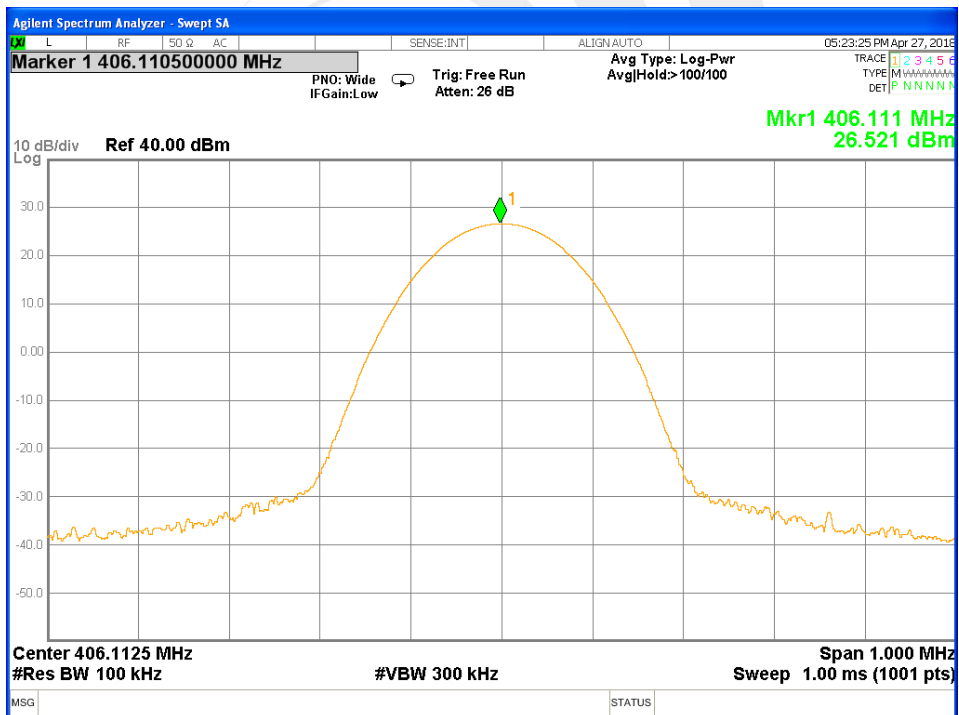
CH 3

Model 1



CH 1

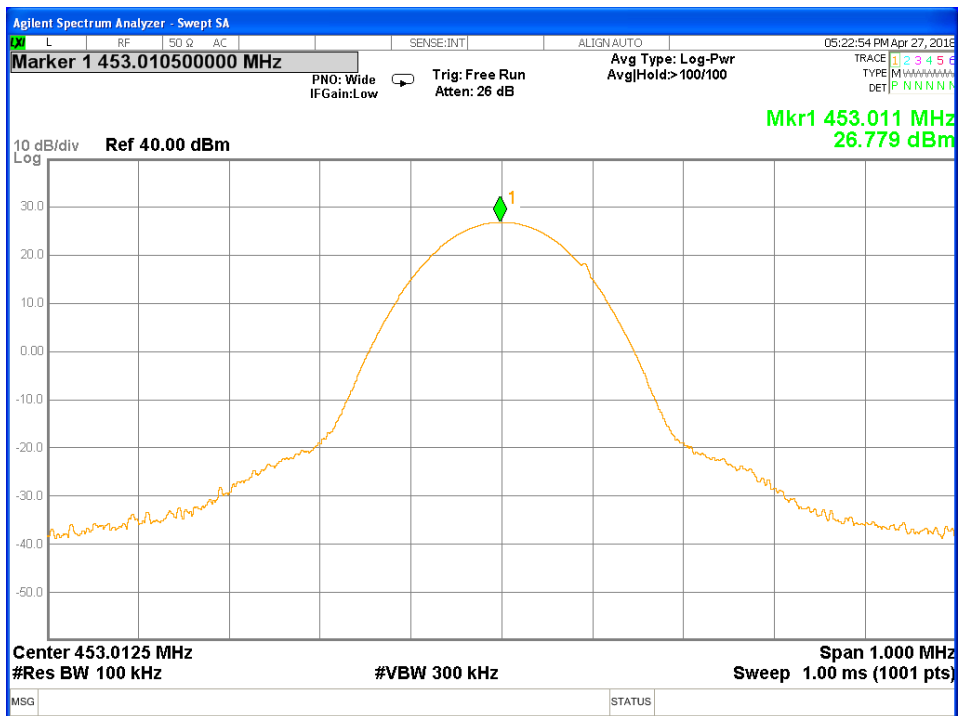
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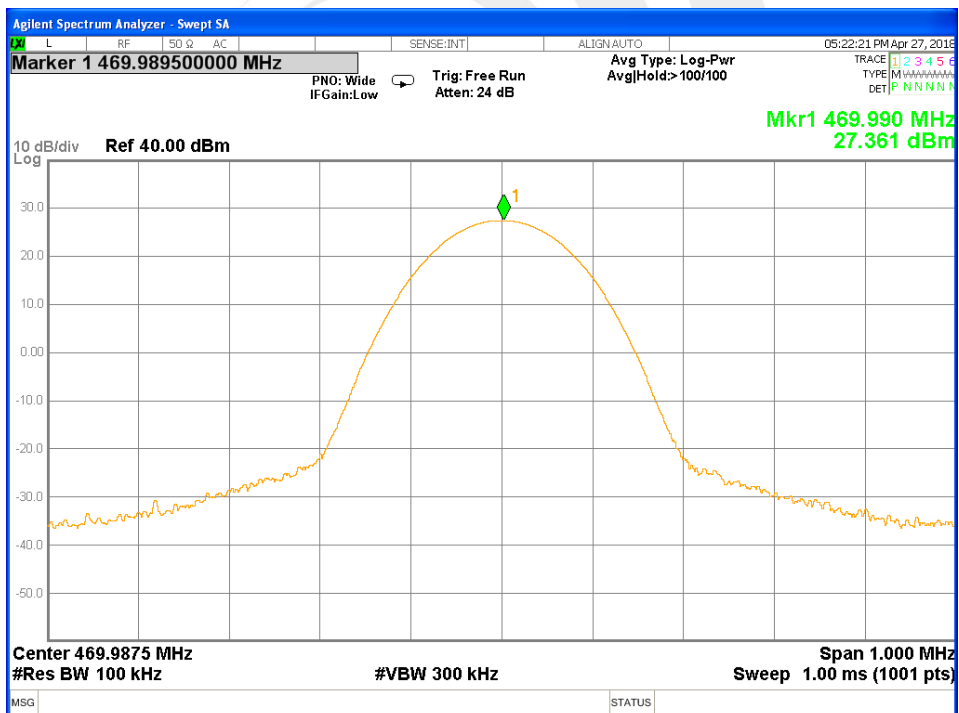
CH 2

Model 2



CH 3

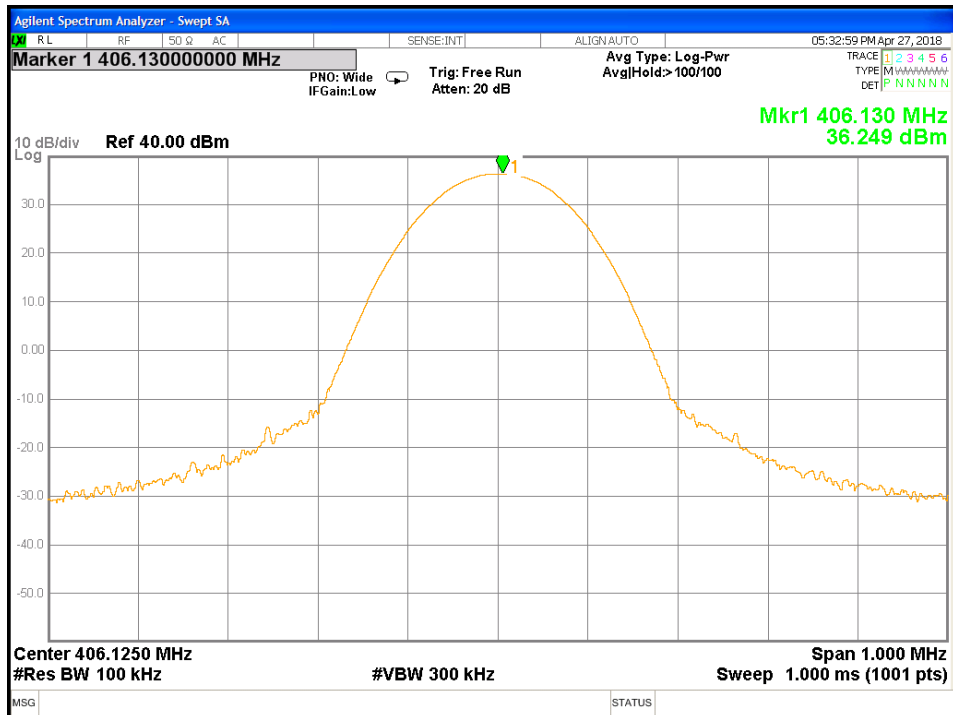
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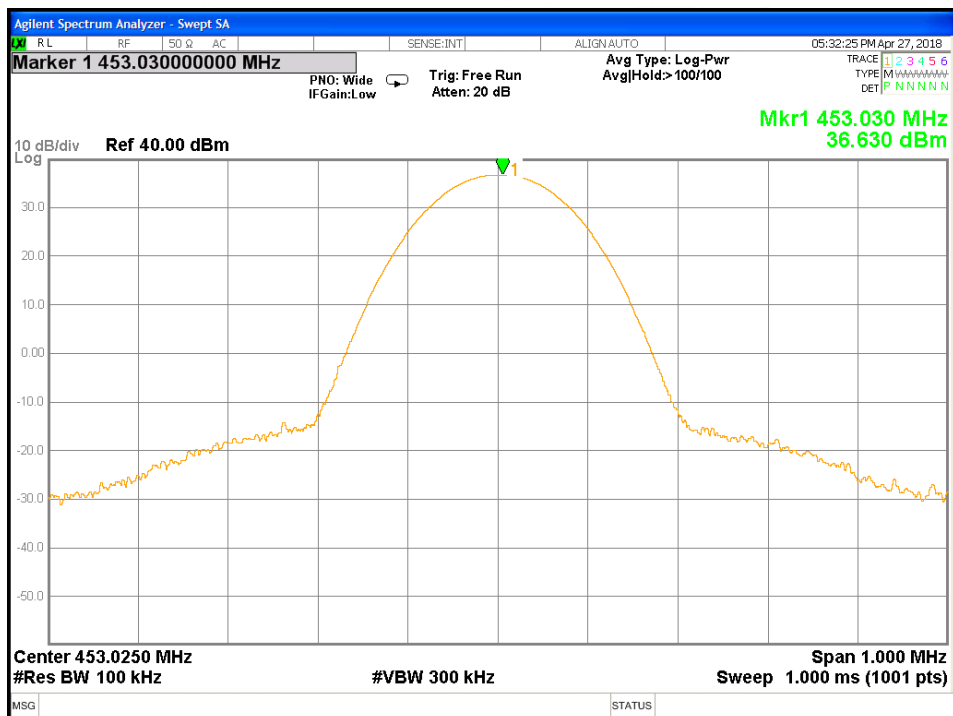
CH 1

Model 3



CH 2

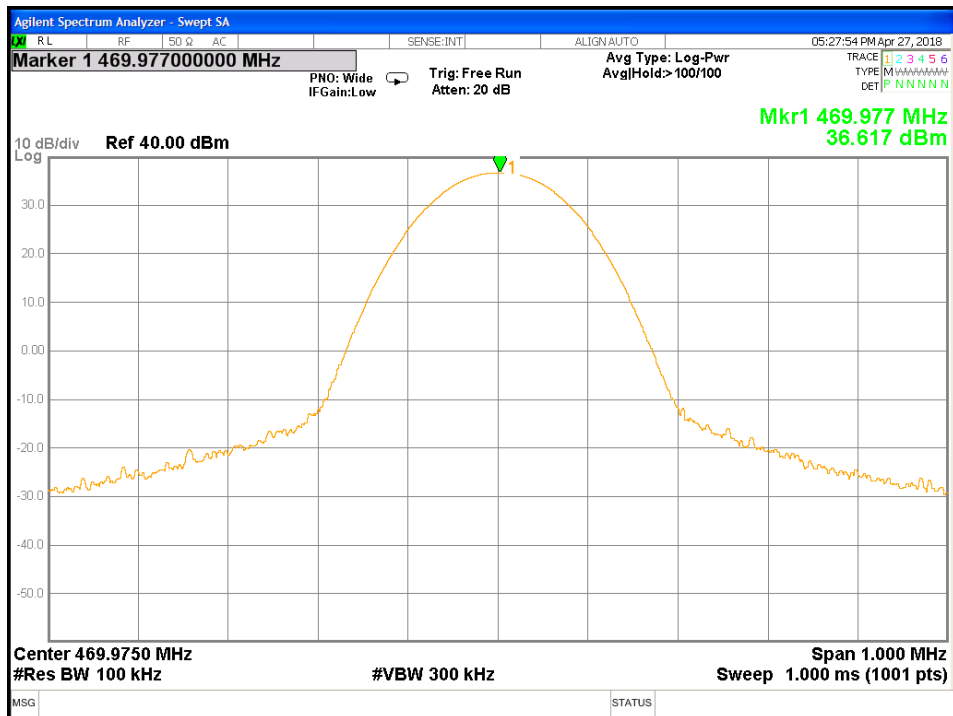
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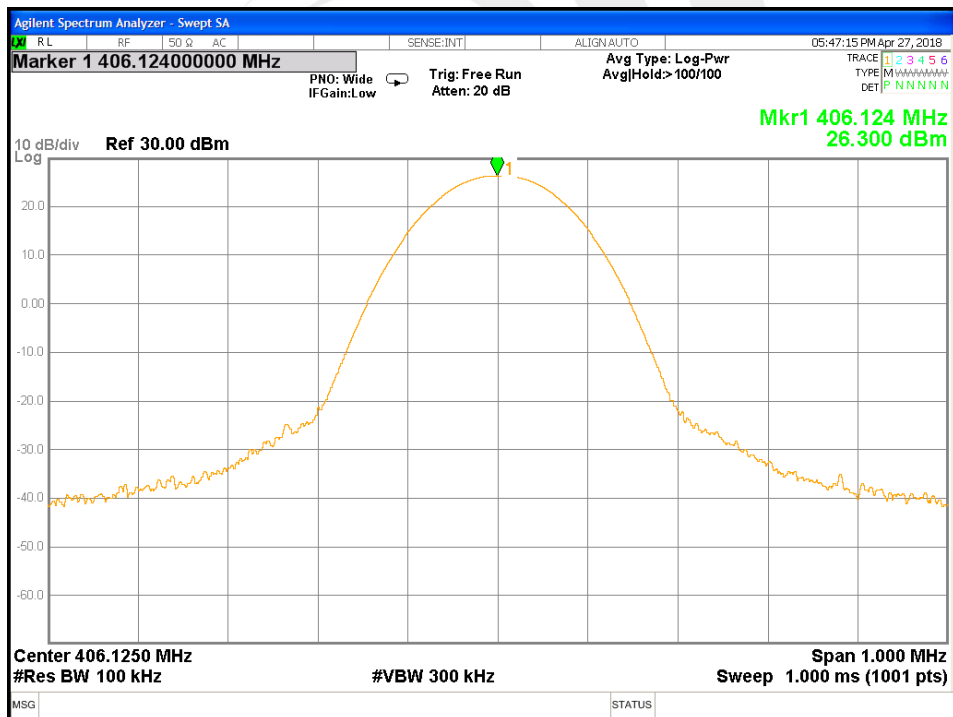
CH 3

Model 3



CH 1

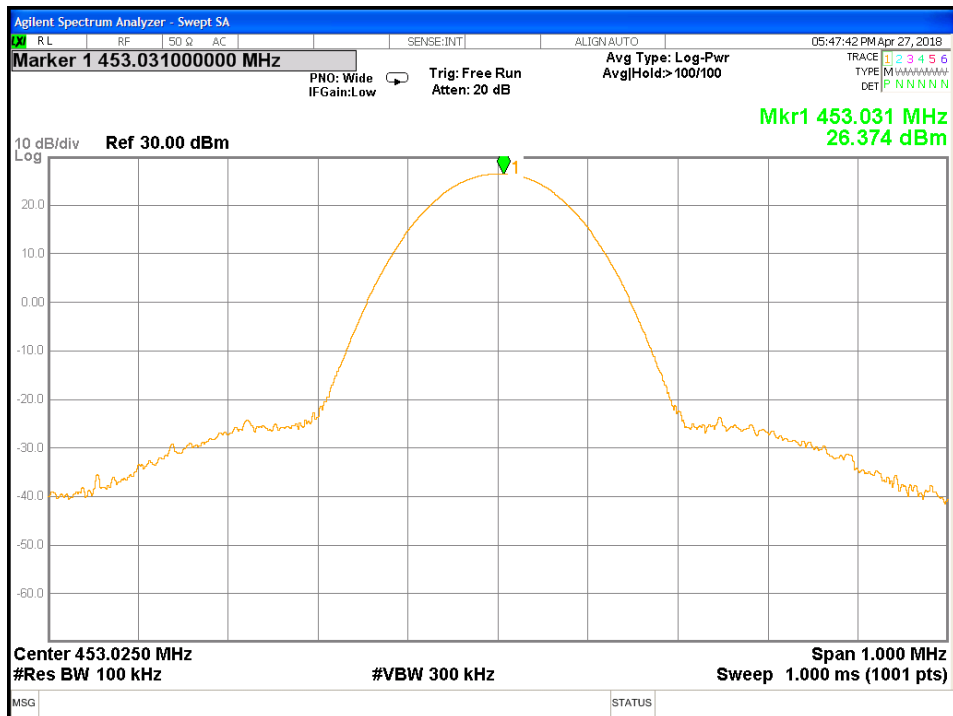
Model 4





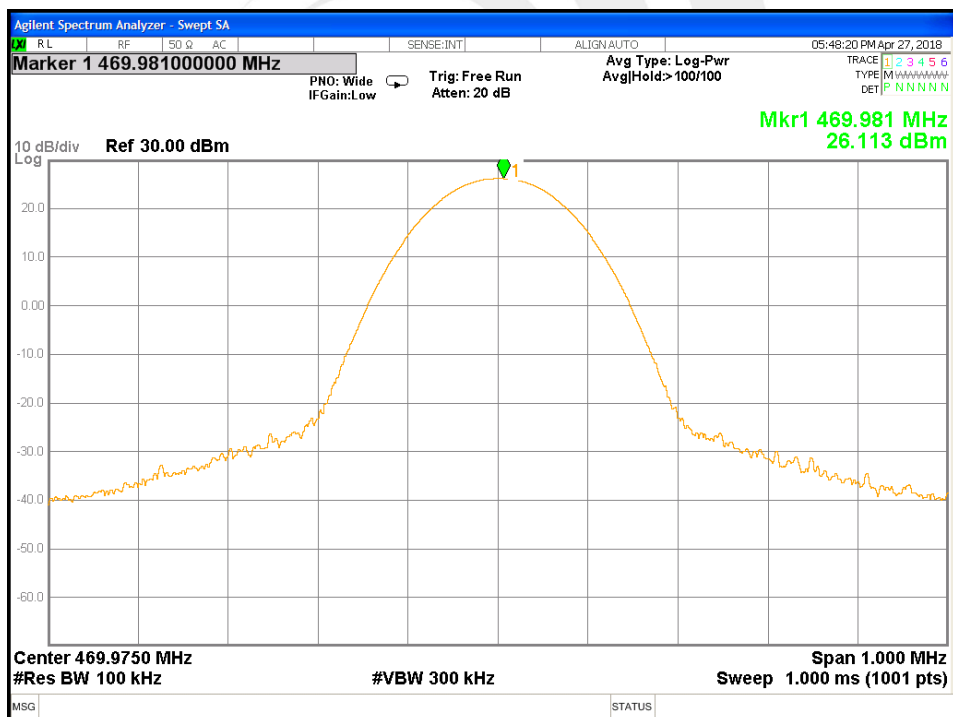
CH 2

Model 4



CH 3

Model 4



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 MEASUREMENT PROCEDURE

a. The EUT was connected to the Spectrum Analyzer.

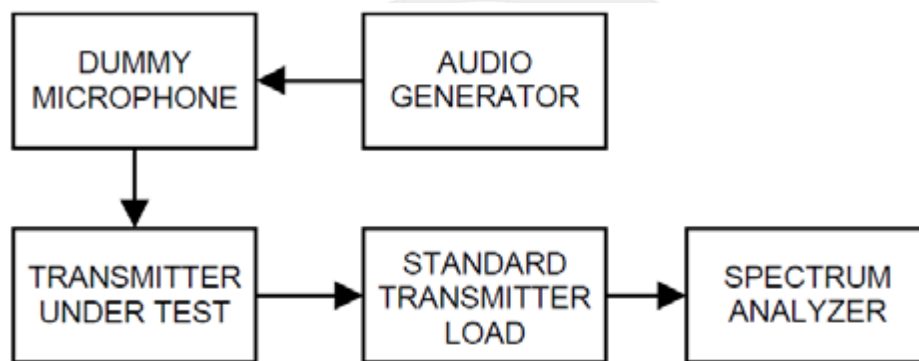
The EUT was modulated by 2.5KHz Sine wave audio signal; the level of the audio signal employed is 16dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5kHz (12.5kHz channel spacing) and 5kHz(25kHz channel spacing)

c. Set EUT as normal operation.

d. Set SPA Center Frequency=fundamental frequency, RBW=300Hz, VBW=3KHz, span =50KHz.

e. Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

4.3 TEST SETUP BLOCK DIAGRAM



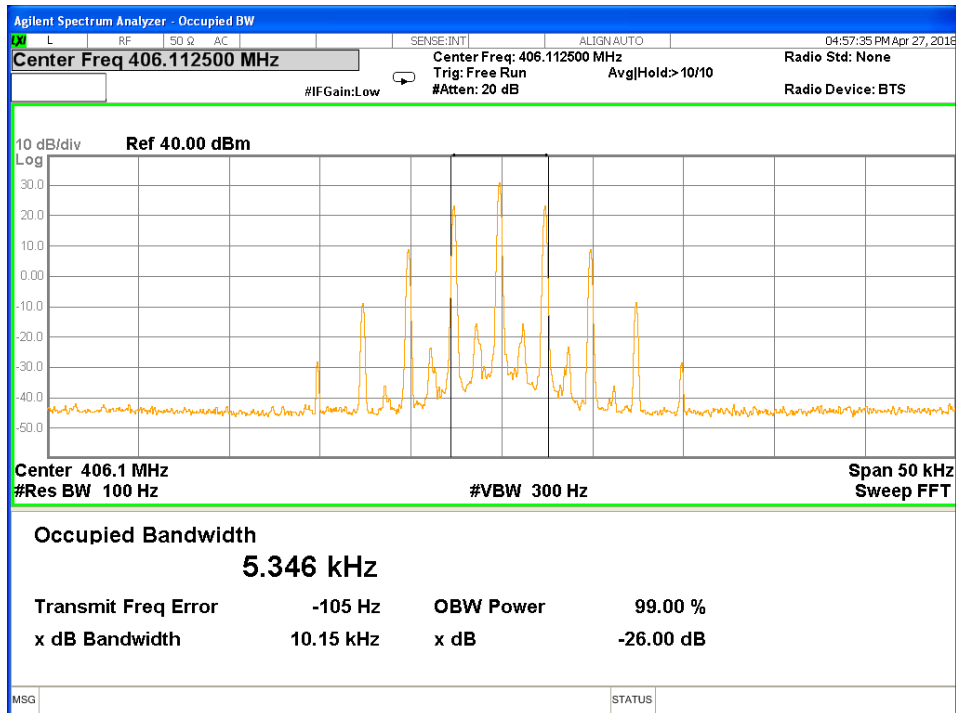
4.4 TEST RESULT

Modulation Type	Channel Sparation	Operation Mode	Test Channel	Test Frequency (MHz)	Occupied Bandwidth (KHz)	
					99%	26dB
FM	12.5KHz	Mode 1	CH1	406.1125	5.346	10.15
			CH2	453.0125	7.540	10.14
			CH3	469.9875	5.332	10.14
		Mode 2	CH1	406.1125	5.325	10.14
			CH2	453.0125	5.321	10.14
			CH3	469.9875	5.324	10.14



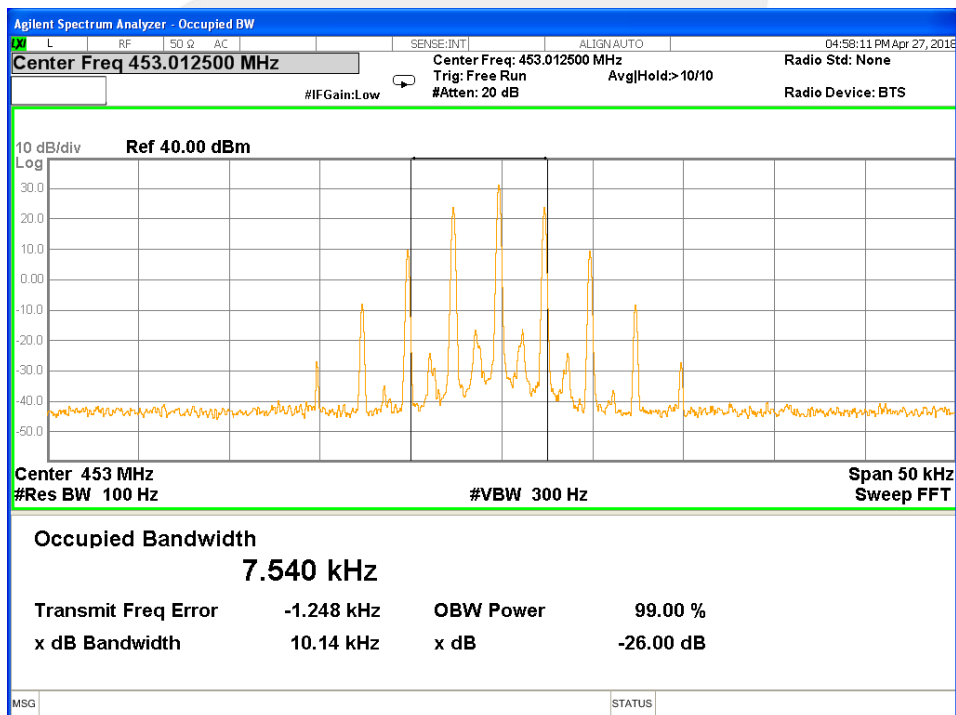
CH 1

Model 1



CH 2

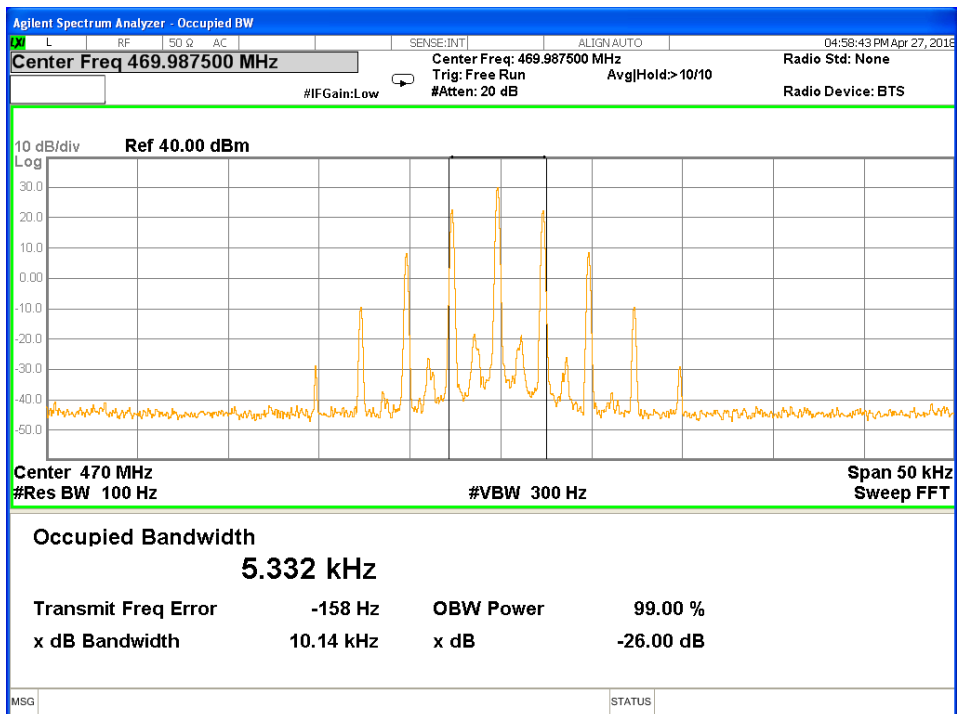
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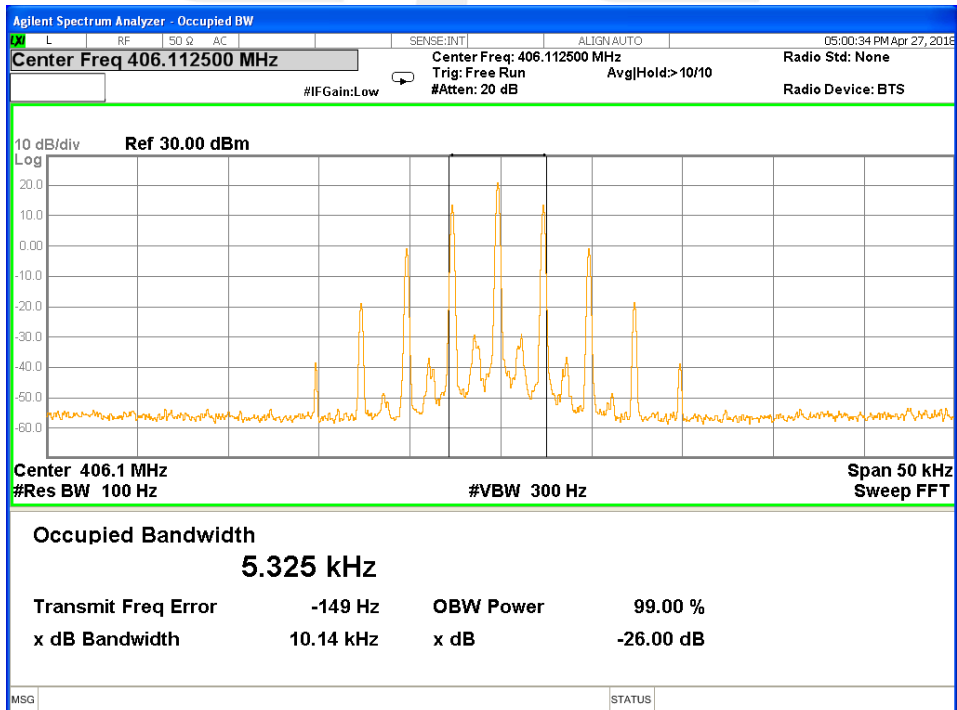
CH 3

Model 1



CH 1

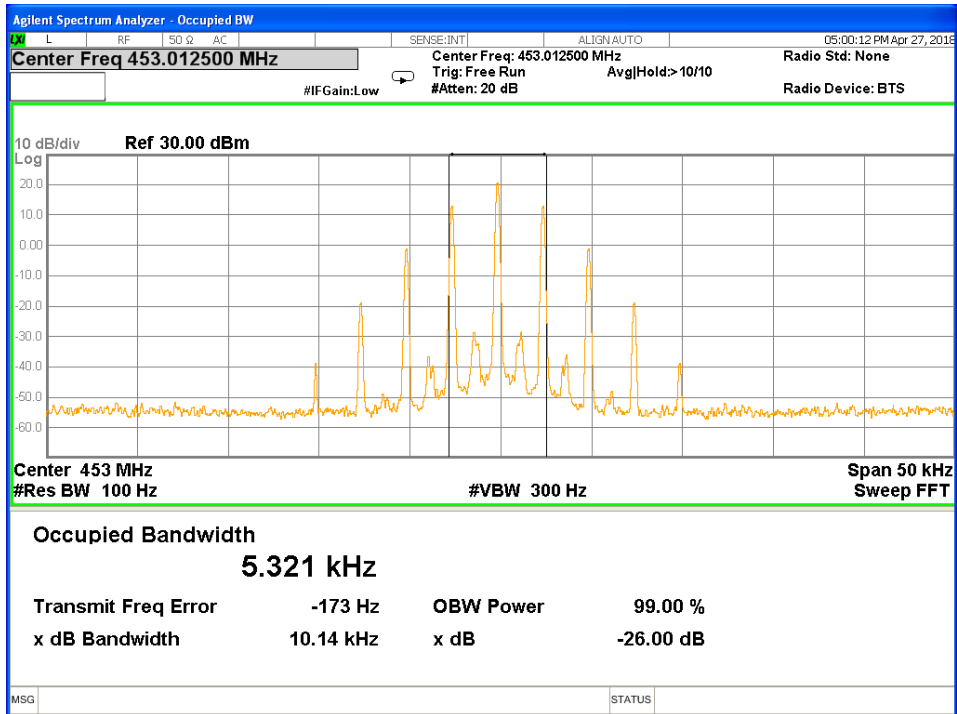
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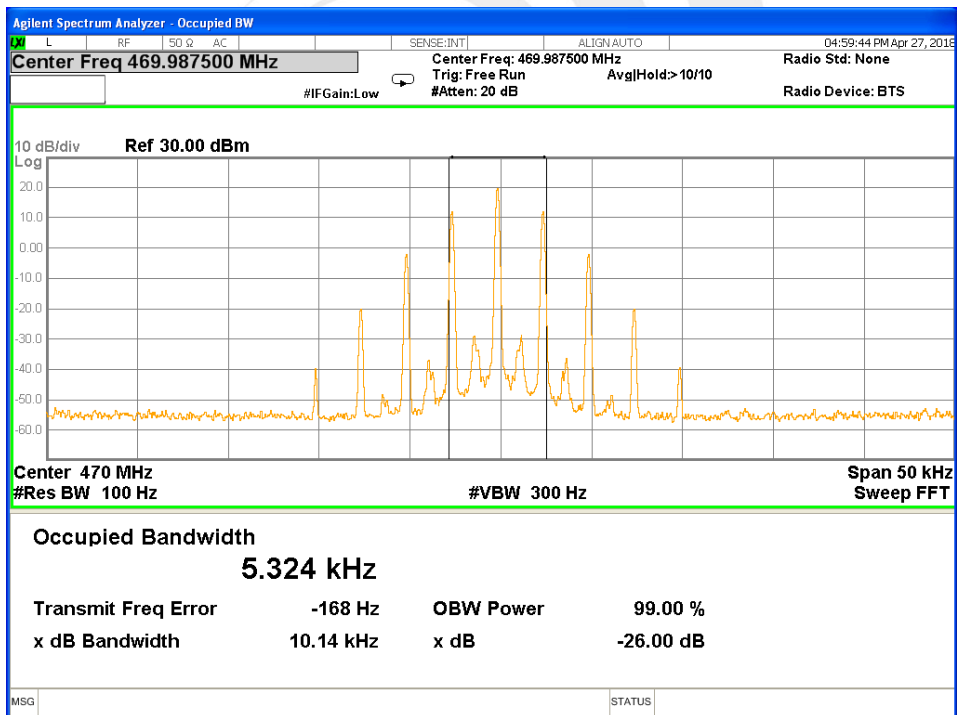
CH 2

Model 2



CH 3

Model 2

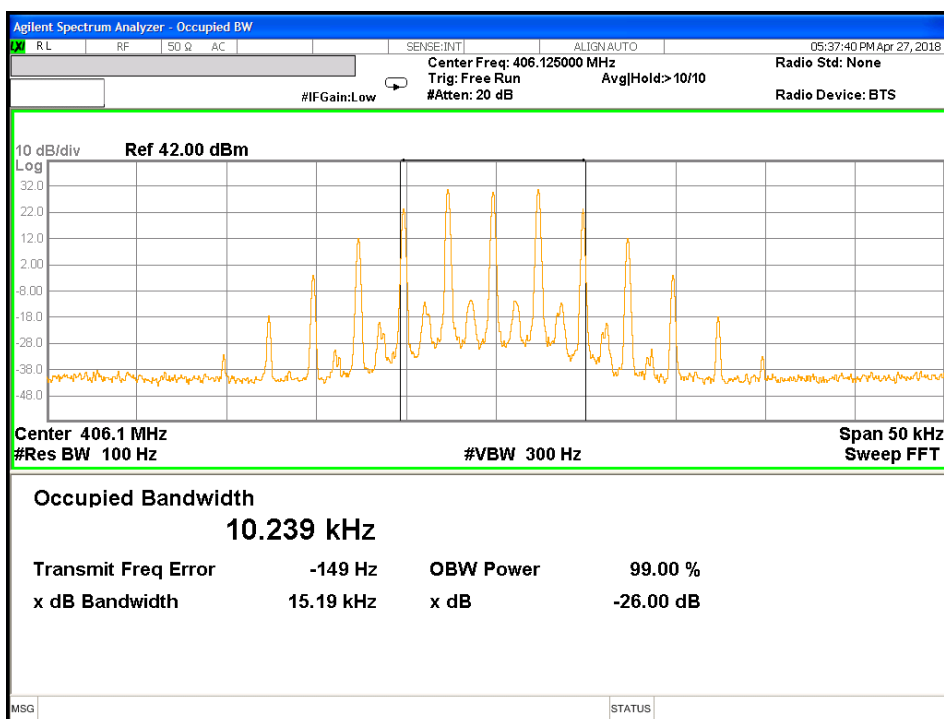




Modulation Type	Channel Sparation	Operation Mode	Test Channel	Test Frequency (MHz)	Occupied Bandwidth (KHz)	
					99%	26dB
FM	25.0KHz	Mode 3	CH1	406.125	10.239	15.19
			CH2	453.025	10.236	15.20
			CH3	469.975	10.230	15.20
		Mode 4	CH1	406.125	10.510	15.21
			CH2	453.025	10.275	15.20
			CH3	469.975	10.245	15.21

CH 1

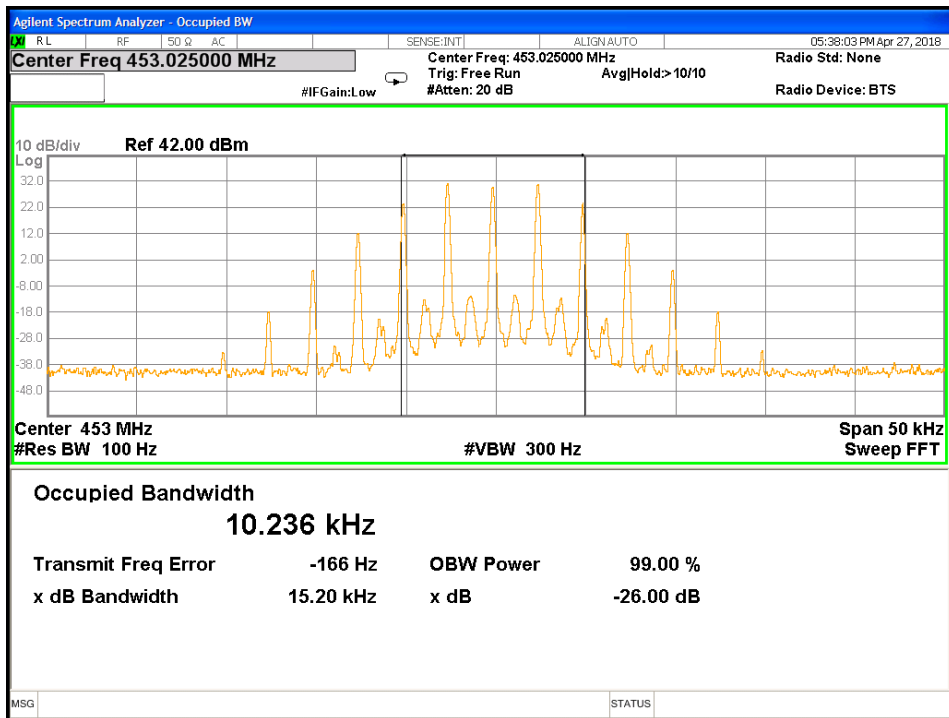
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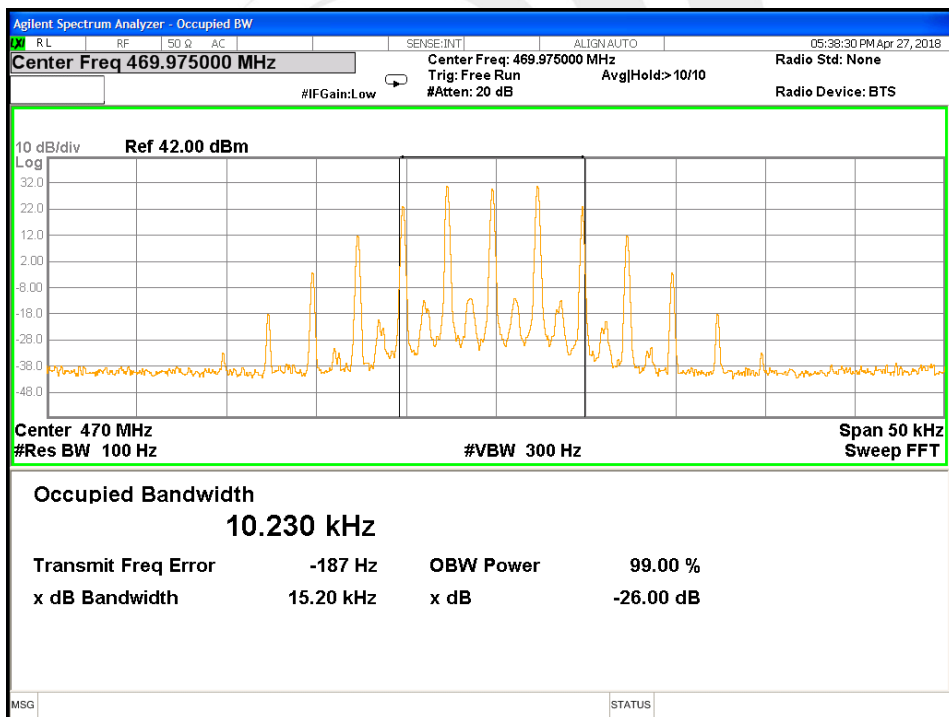
CH 2

Model 3



CH 3

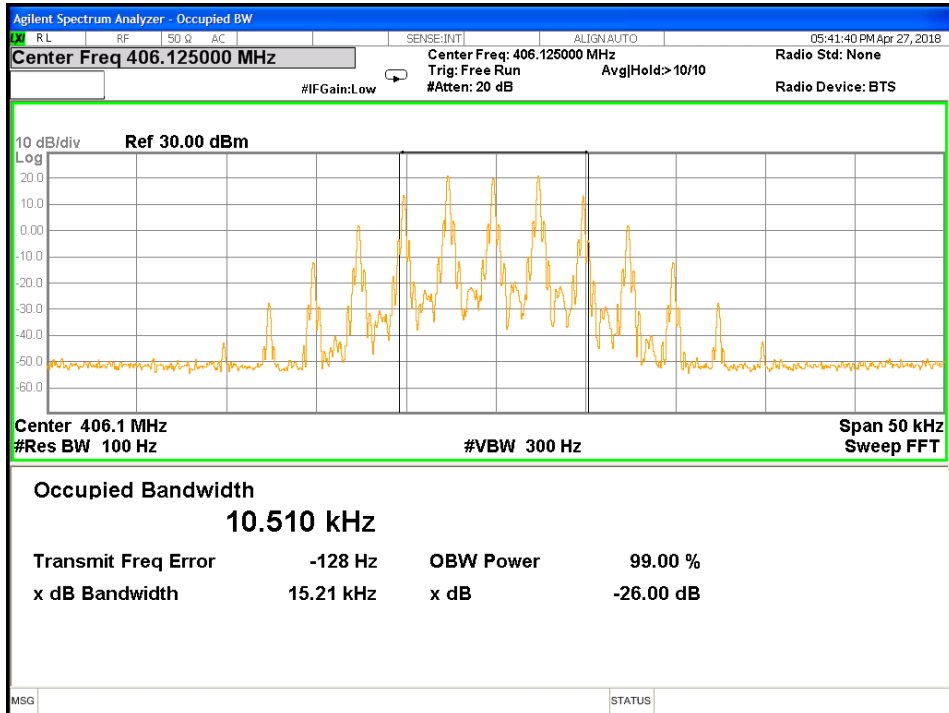
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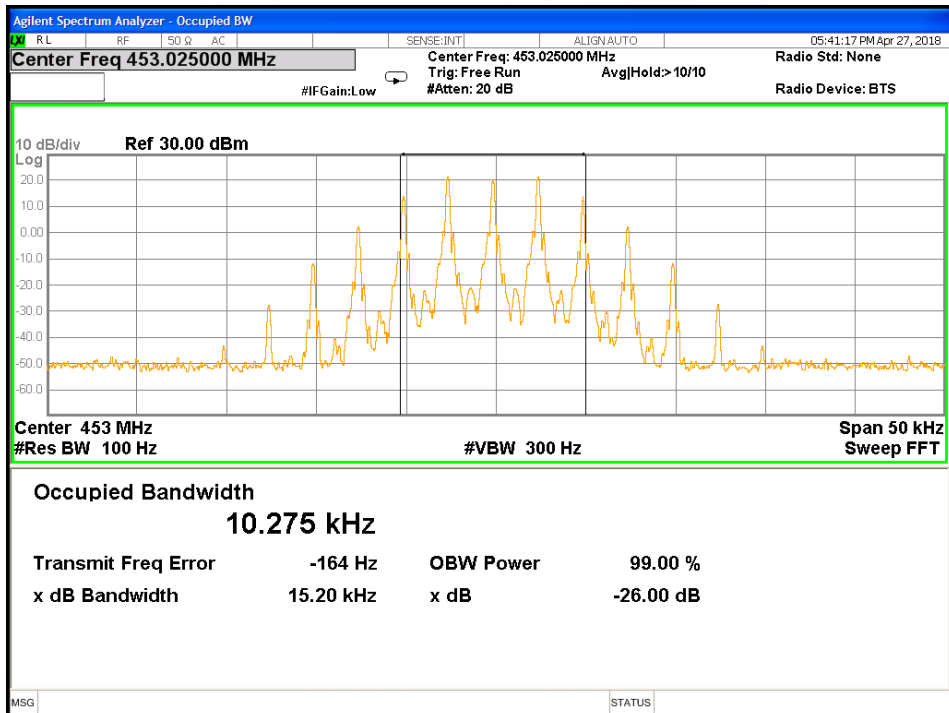
CH 1

Model 4



CH 2

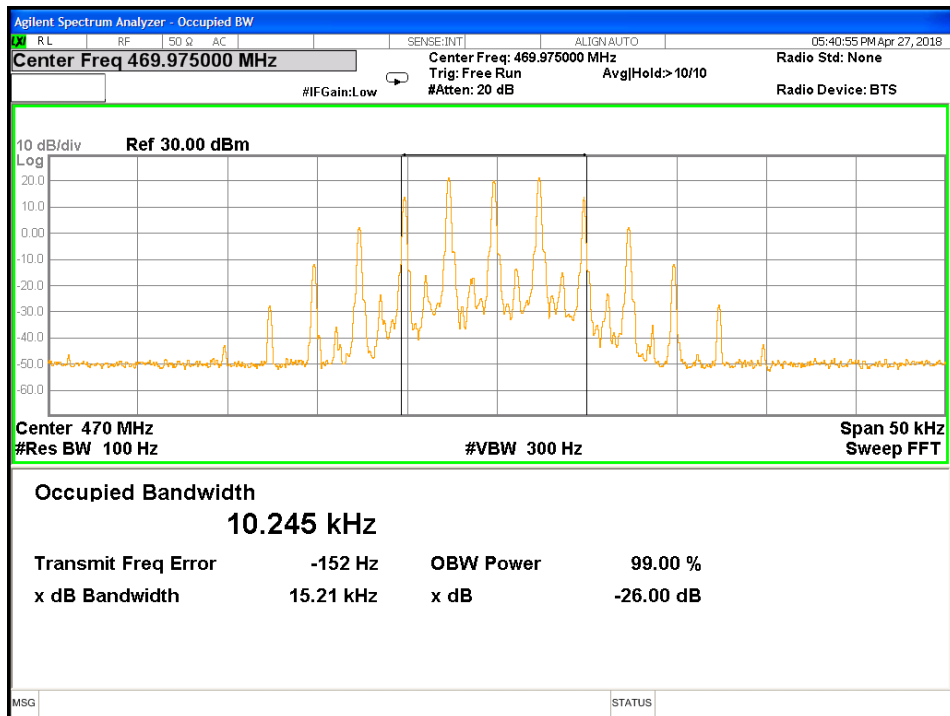
Model 4





CH 3

Model 4



5. EMISSION MASK

5.1 PROVISIONS APPLICABLE

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.

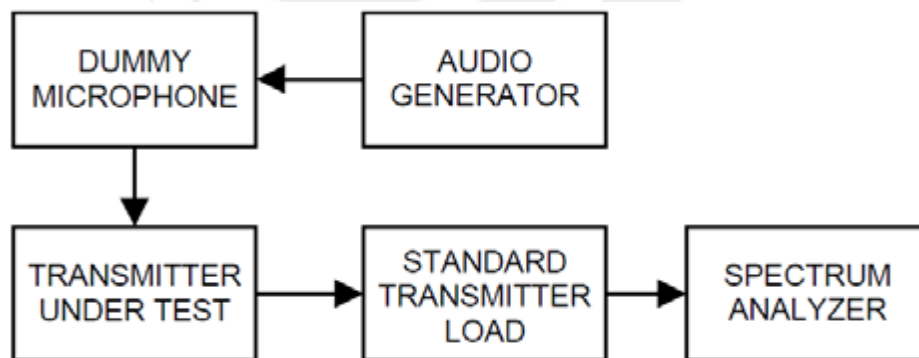
5.2 MEASUREMENT PROCEDURE

- a. The EUT was connected to the Spectrum Analyzer.

The EUT was modulated by 2.5KHz Sine wave audio signal; the level of the audio signal

- b. 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)
- c. Set EUT as normal operation.
- d. Set SPA Center Frequency=fundamental frequency, RBW=300Hz, VBW=3KHz, span =50KHz.

5.3 TEST SETUP BLOCK DIAGRAM

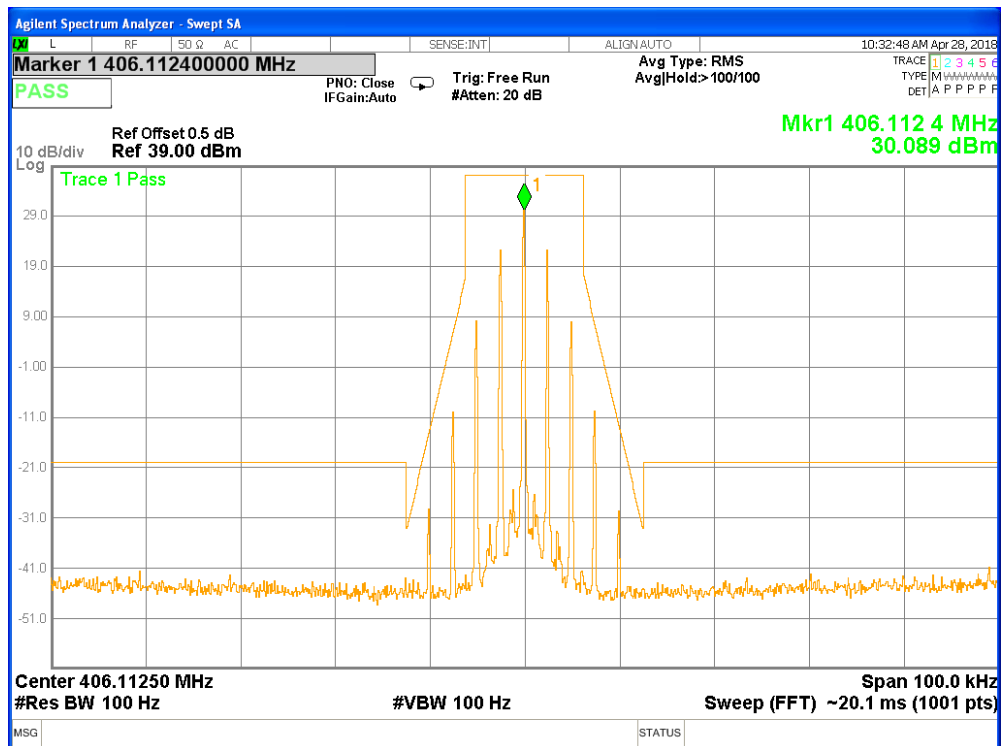




5.4 MEASUREMENT RESULT:

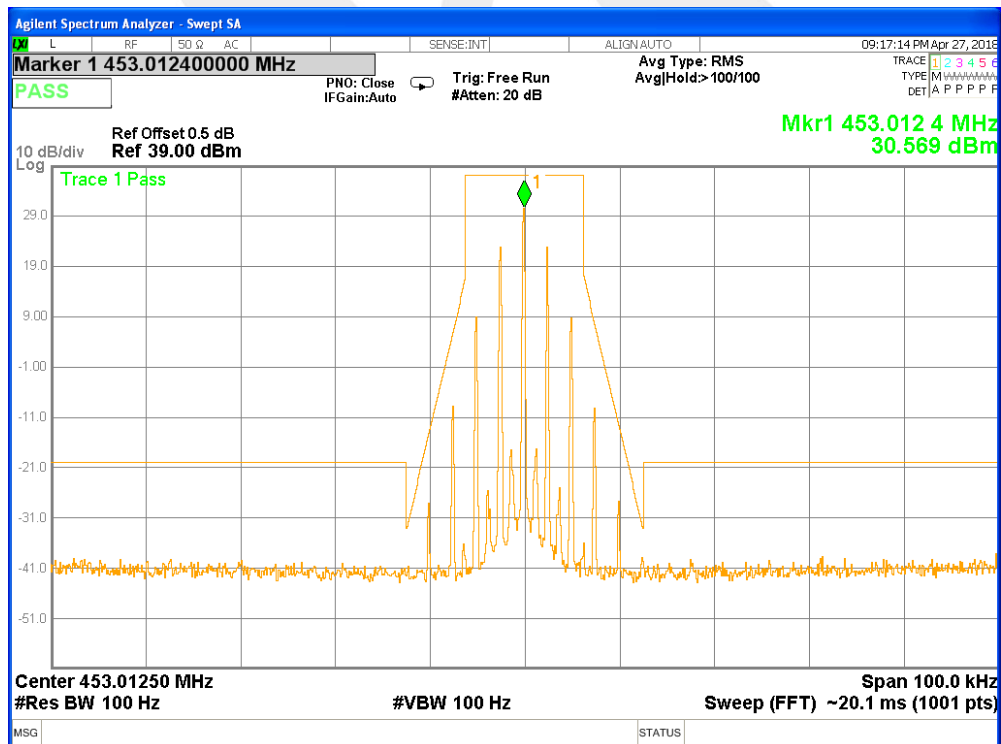
CH 1

Model 1



CH 2

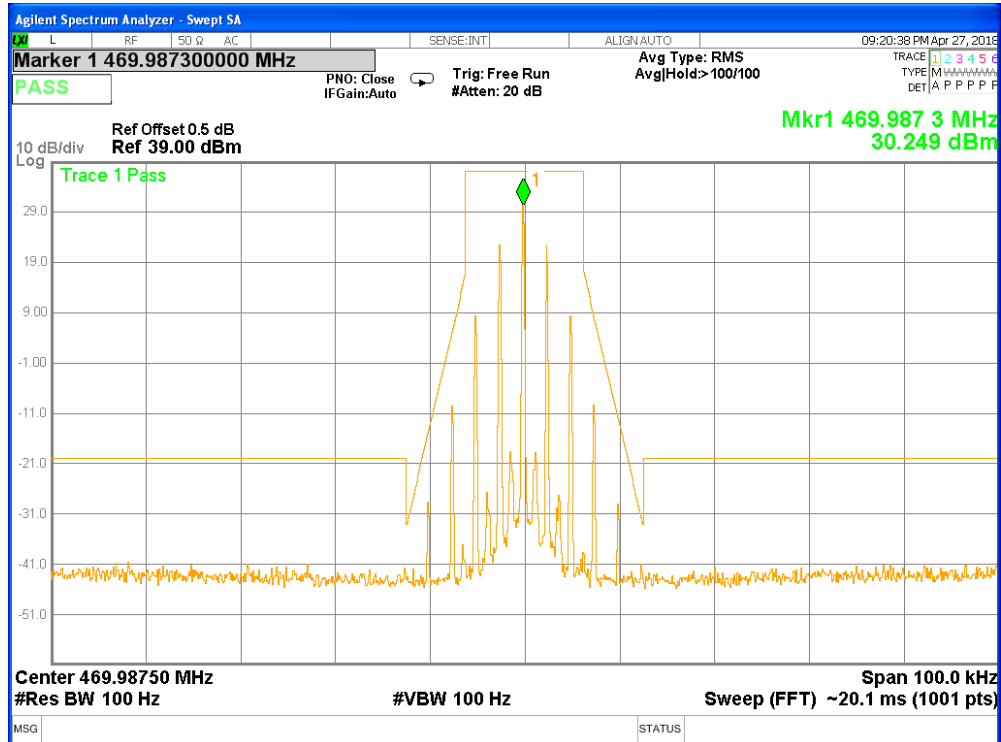
Model 1





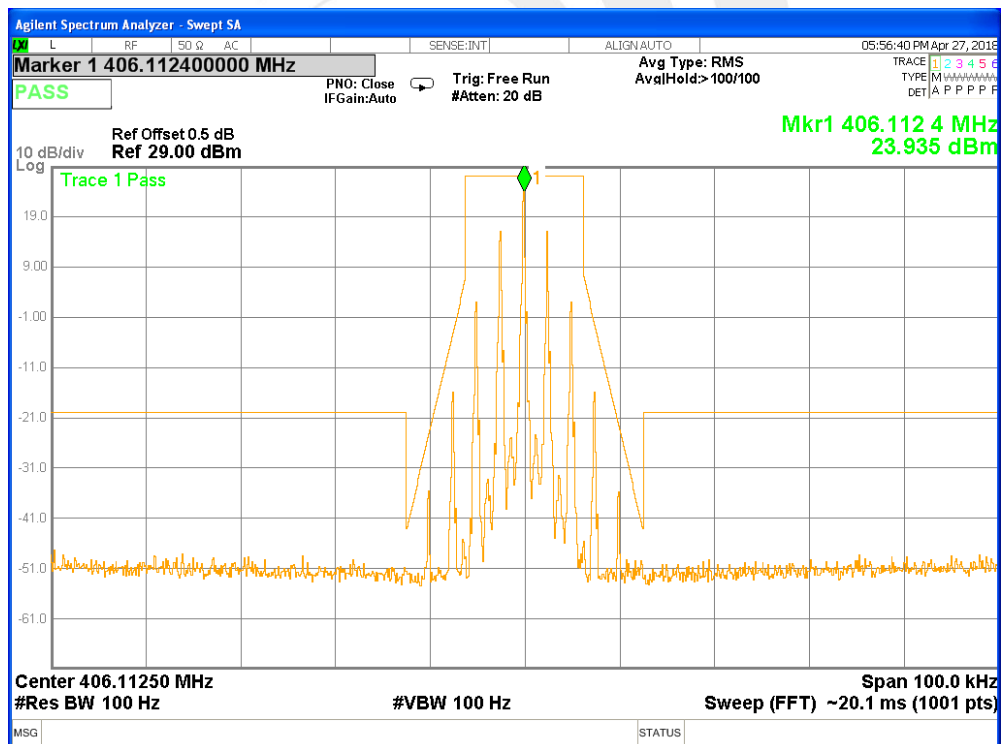
CH 3

Model 1



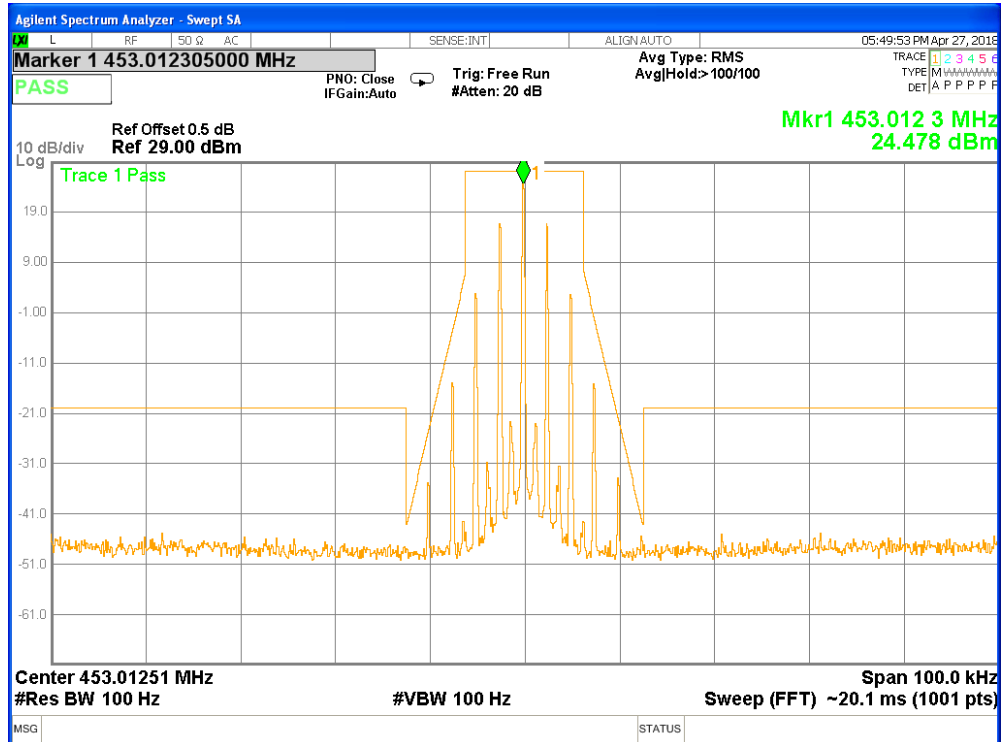
CH 1

Model 2



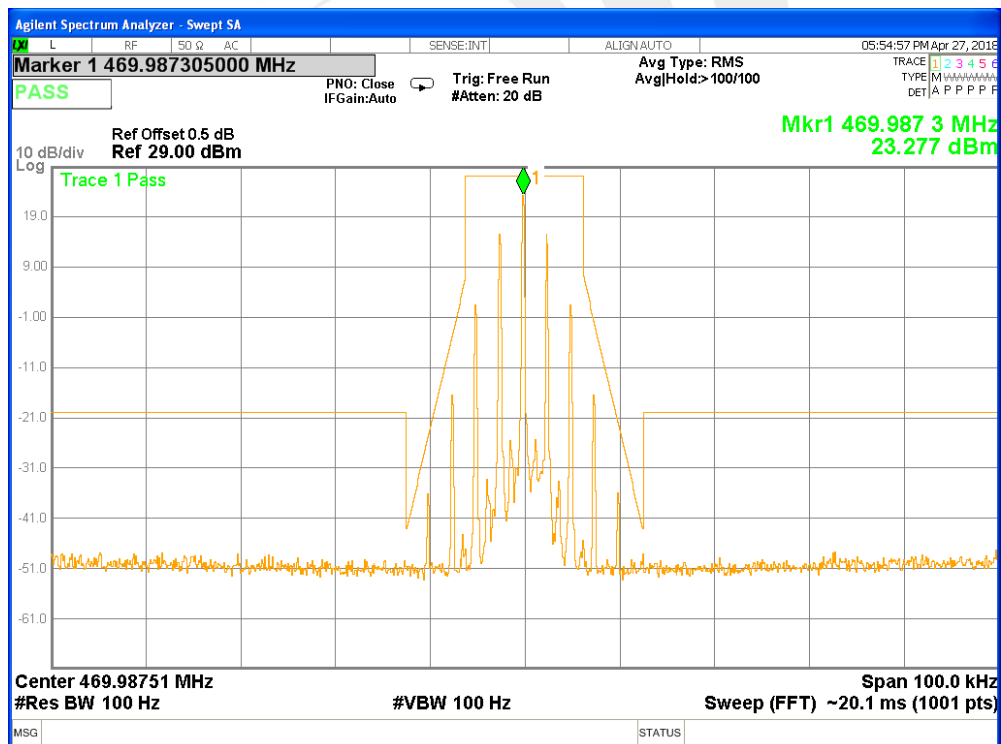
CH 2

Model 2



CH 3

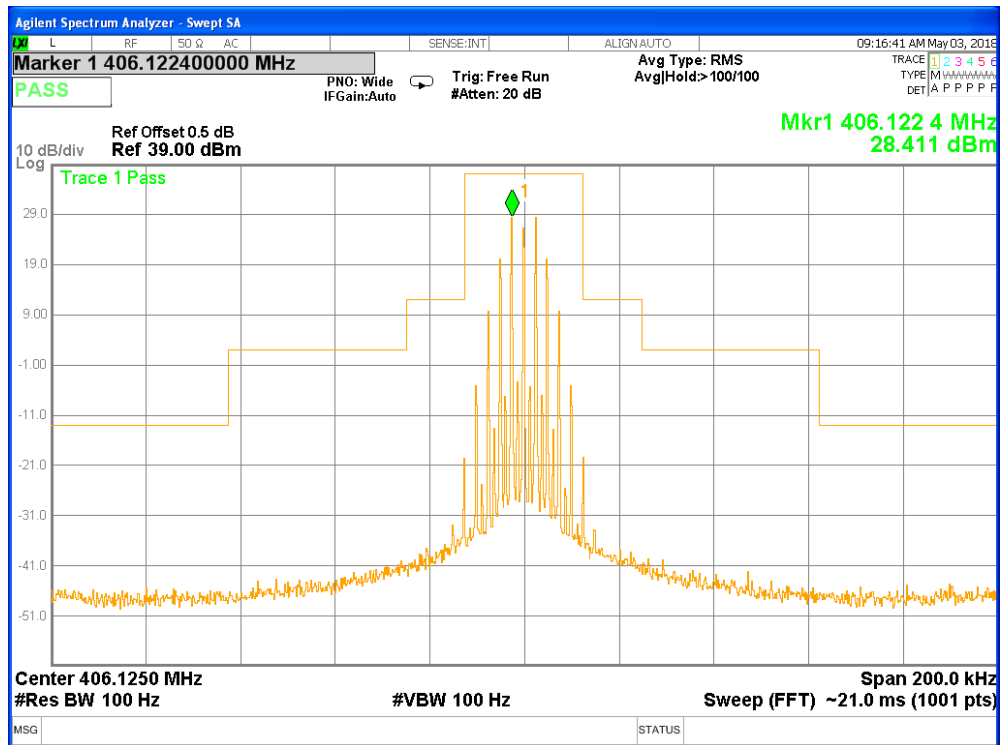
Model 2





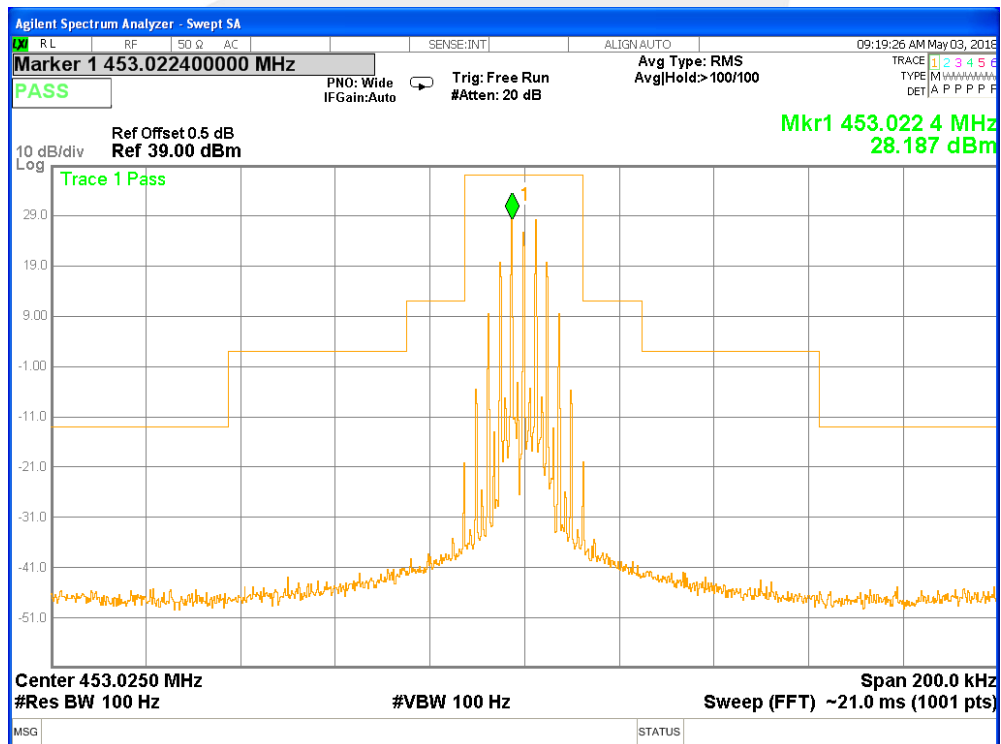
CH 1

Model 3



CH 2

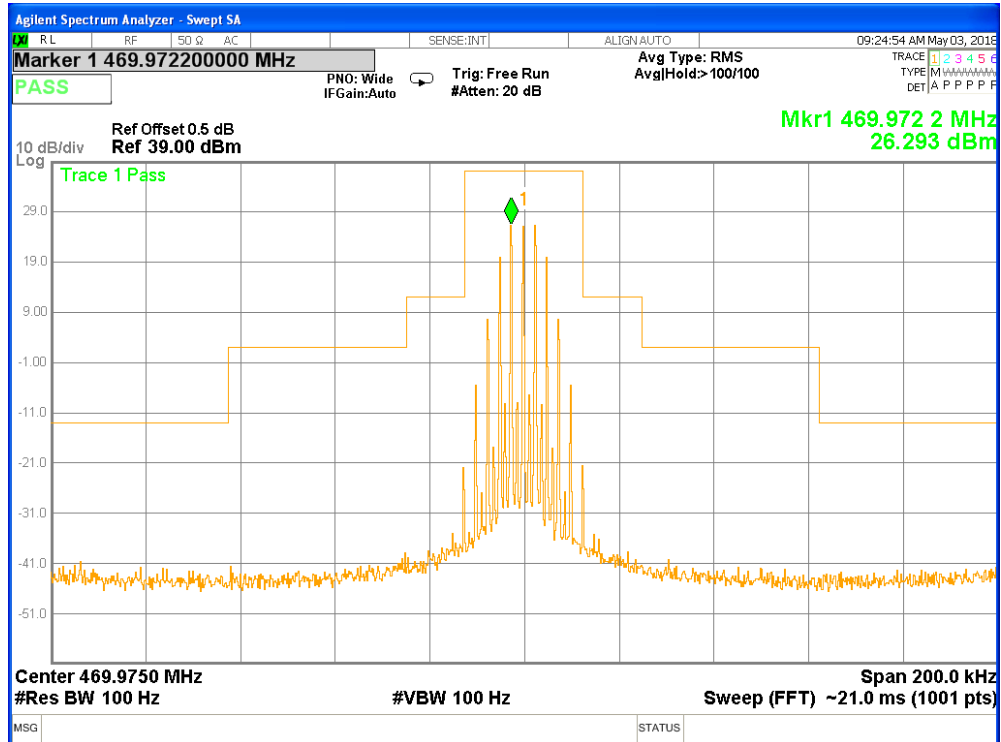
Model 3





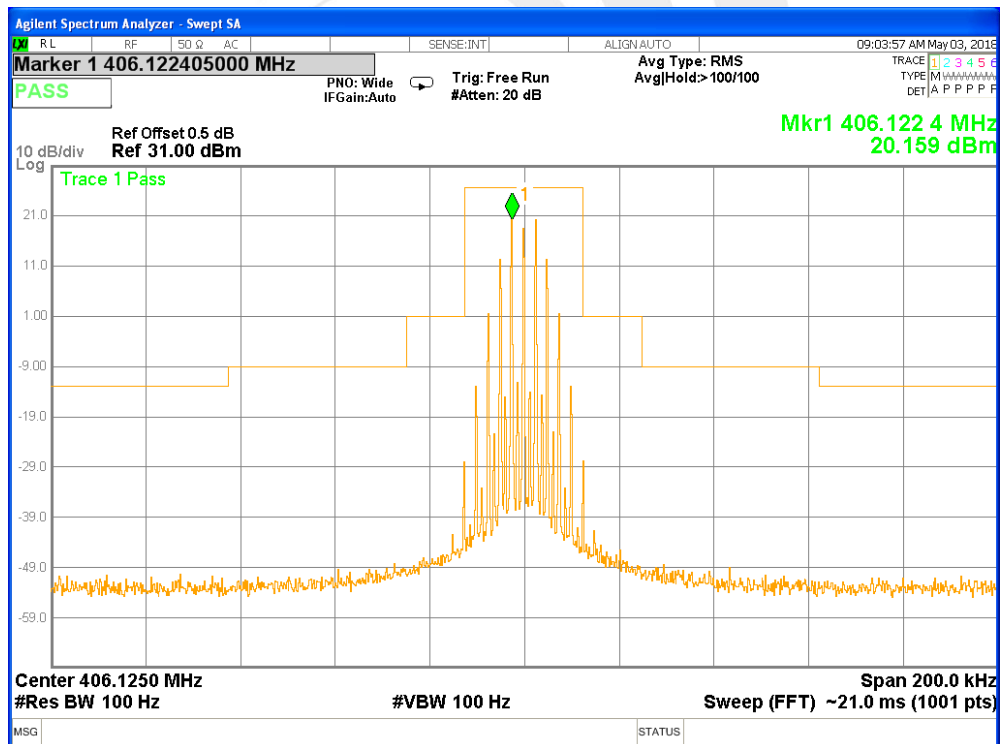
CH 3

Model 3



CH 1

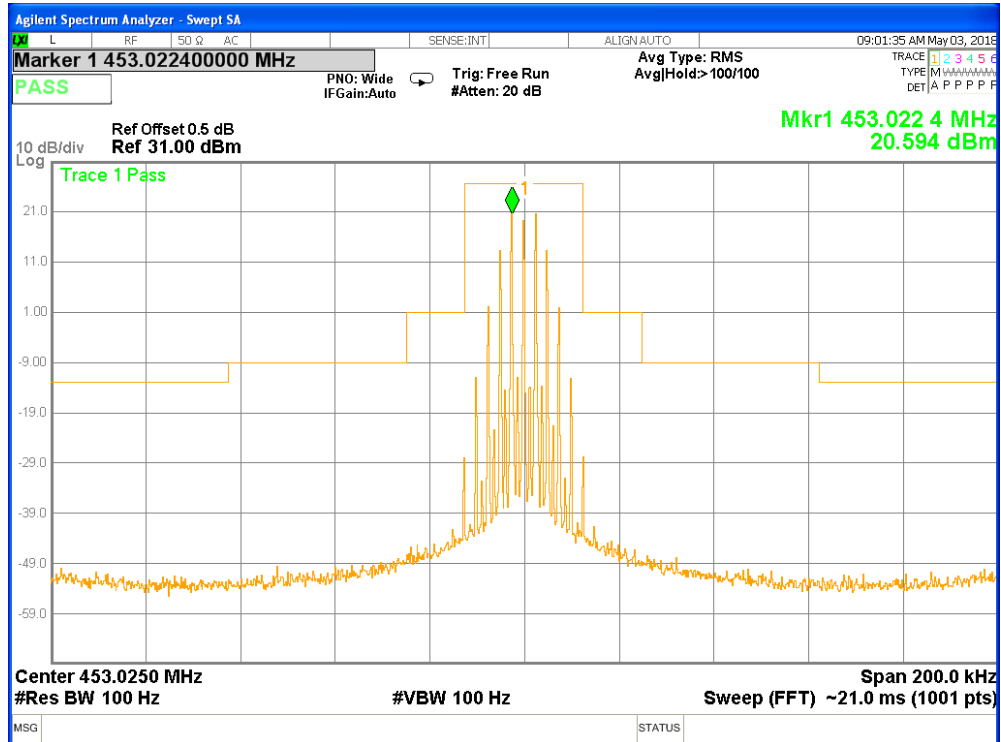
Model 4





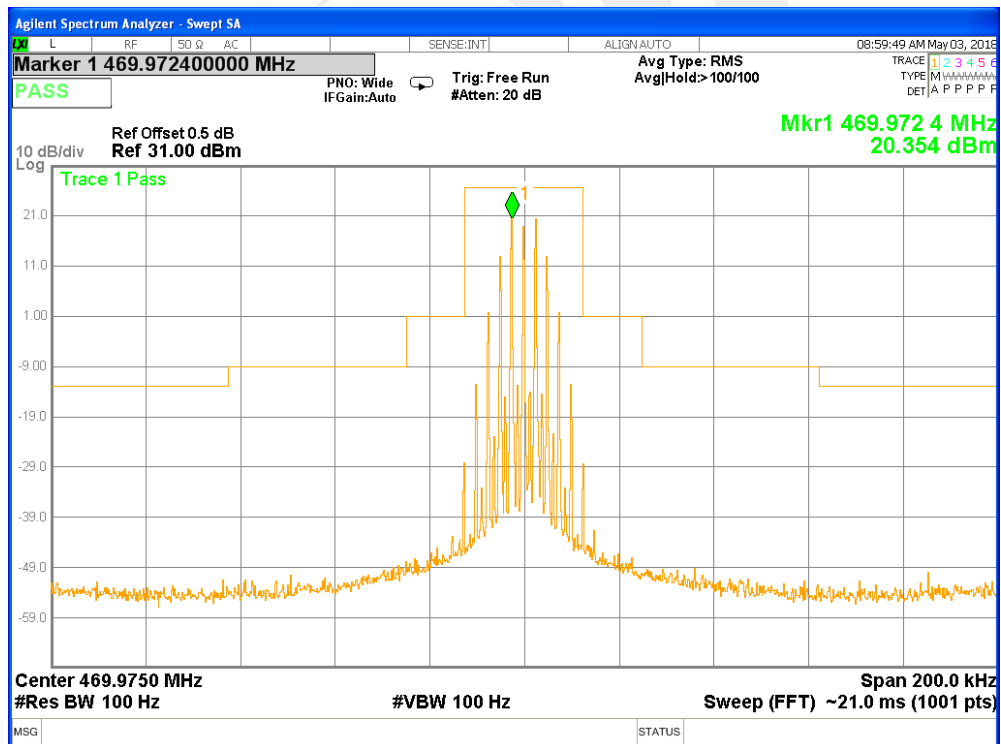
CH 2

Model 4



CH 3

Model 4





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, which ever is lesser attenuation.

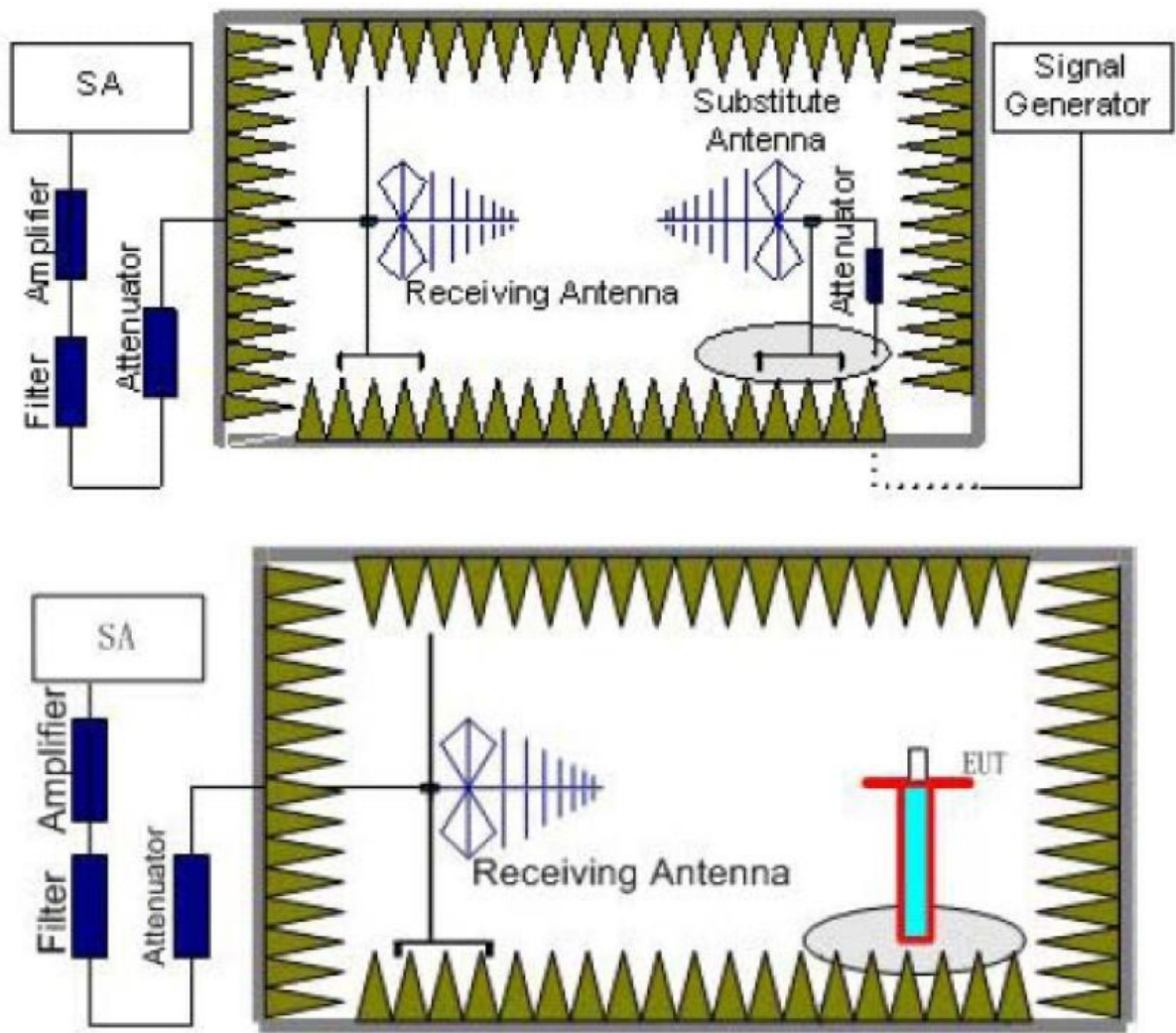
For transmitters designed to transmit with 25 KHz channel separation and equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as following:

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.

6.2 TEST PROCEDURE

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

6.3 TEST CONFIGURATION





6.4 TEST RESULT

CH 1					Model 1		
Frequency	Result					Limit (dBm)	Conclusion
	P _{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P _{Meas} E.I.R.P(dBm)	Polarization		
					Of Max. EIRP		
812.225	-32.73	0.44	6.4	-26.77	Horizontal	-20.00	Pass
1218.3375	-35.56	1.02	8.63	-27.95	Horizontal	-20.00	Pass
1624.45	-32.08	1.52	10.2	-23.4	Horizontal	-20.00	Pass
812.225	-35.17	0.44	6.4	-29.21	Vertical	-20.00	Pass
1218.3375	-32.25	1.02	8.63	-24.64	Vertical	-20.00	Pass
1624.45	-35.49	1.52	10.2	-26.81	Vertical	-20.00	Pass

CH 2					Model 1		
Frequency	Result					Limit (dBm)	Conclusion
	P _{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P _{Meas} E.I.R.P(dBm)	Polarization		
					Of Max. EIRP		
906.025	-34.92	0.44	6.4	-28.96	Horizontal	-20.00	Pass
1359.0375	-37.23	1.13	8.63	-29.73	Horizontal	-20.00	Pass
1812.05	-33.17	1.57	10.2	-24.54	Horizontal	-20.00	Pass
906.025	-37.39	0.44	6.4	-31.43	Vertical	-20.00	Pass
1359.0375	-33.51	1.13	8.63	-26.01	Vertical	-20.00	Pass
1812.05	-37.27	1.57	10.2	-28.64	Vertical	-20.00	Pass

CH 3					Model 1		
Frequency	Result					Limit (dBm)	Conclusion
	P _{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P _{Meas} E.I.R.P(dBm)	Polarization		
					Of Max. EIRP		
939.975	-33.47	0.46	6.4	-27.53	Horizontal	-20.00	Pass
1409.9625	-35.21	1.17	8.63	-27.75	Horizontal	-20.00	Pass
1879.95	-32.58	1.63	10.2	-24.01	Horizontal	-20.00	Pass
939.975	-36.38	0.46	6.4	-30.44	Vertical	-20.00	Pass
1409.9625	-32.18	1.17	8.63	-24.72	Vertical	-20.00	Pass
1879.95	-35.42	1.63	10.2	-26.85	Vertical	-20.00	Pass

Note: $EIRP = P_{Meas}(dBm) - P_{cl}(dB) + G_a(dBi)$

We were not recorded other points as values lower than limits



CH 1					Model 3		
Frequency	Result					Limit (dBm)	Conclusion
	P _{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P _{Meas} E.I.R.P.(dBm)	Polarization		
					Of Max. EIRP		
812.25	-32.28	0.44	6.4	-26.32	Horizontal	-13.00	Pass
1218.375	-35.17	1.02	8.63	-27.56	Horizontal	-13.00	Pass
1624.50	-32.69	1.52	10.2	-24.01	Horizontal	-13.00	Pass
812.25	-33.47	0.44	6.4	-27.51	Vertical	-13.00	Pass
1218.375	-32.64	1.02	8.63	-25.03	Vertical	-13.00	Pass
1624.50	-35.36	1.52	10.2	-26.68	Vertical	-13.00	Pass

CH 2					Model 3		
Frequency	Result					Limit (dBm)	Conclusion
	P _{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P _{Meas} E.I.R.P.(dBm)	Polarization		
					Of Max. EIRP		
906.05	-34.17	0.44	6.4	-28.21	Horizontal	-13.00	Pass
1359.075	-36.24	1.13	8.63	-28.74	Horizontal	-13.00	Pass
1812.1	-33.17	1.57	10.2	-24.54	Horizontal	-13.00	Pass
906.05	-37.39	0.44	6.4	-31.43	Vertical	-13.00	Pass
1359.075	-33.71	1.13	8.63	-26.21	Vertical	-13.00	Pass
1812.1	-37.47	1.57	10.2	-28.84	Vertical	-13.00	Pass

CH 3					Model 3		
Frequency	Result					Limit (dBm)	Conclusion
	P _{meas} (dBm)	Cable loss	Antenna Gain(dBi)	P _{Meas} E.I.R.P.(dBm)	Polarization		
					Of Max. EIRP		
939.95	-33.61	0.46	6.4	-27.67	Horizontal	-13.00	Pass
1409.925	-36.24	1.17	8.63	-28.78	Horizontal	-13.00	Pass
1879.9	-33.75	1.63	10.2	-25.18	Horizontal	-13.00	Pass
939.95	-35.17	0.46	6.4	-29.23	Vertical	-13.00	Pass
1409.925	-32.82	1.17	8.63	-25.36	Vertical	-13.00	Pass
1879.9	-35.67	1.63	10.2	-27.10	Vertical	-13.00	Pass

Note: $EIRP = P_{Meas}(dBm) - P_{cl}(dB) + G_a(dBi)$

We were not recorded other points as values lower than limits

7. SPURIOUS EMISSION ON ANTENNA PORT

7.1 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, which ever is lesser attenuation.

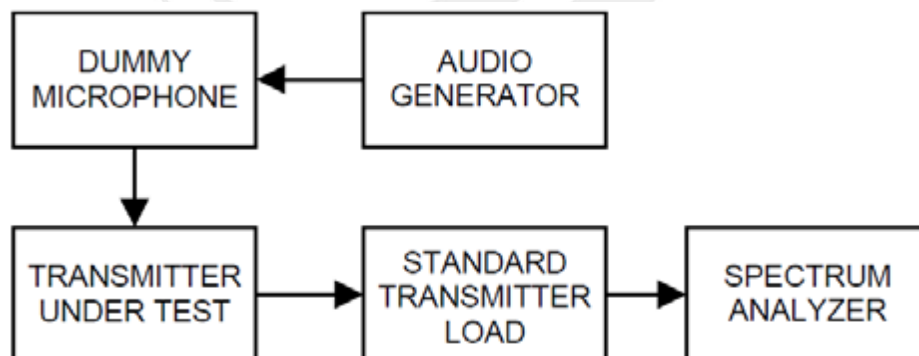
For transmitters designed to transmit with 25 KHz channel separation and equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as following:

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.

7.2 MEASUREMENT PROCEDURE

- a. The EUT was connected to the Spectrum Analyzer.
- b. Sufficient scans were taken to show any out of band emission up to 10th. Harmonic for the lower and the highest frequency range.
- c. Set EUT as normal operation.
- d. 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.
- e. 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 BLOCK DIAGRAM



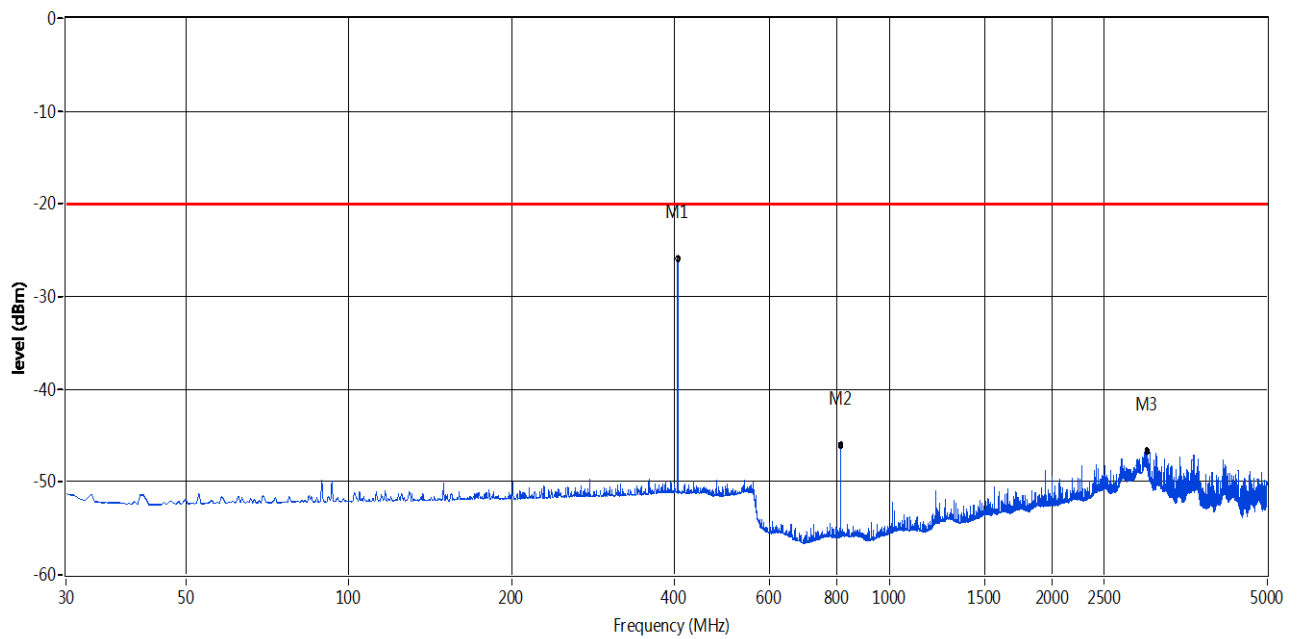


7.4 TEST RESULT

CH 1

Model 1

FCC Test Case_CSE_Part 90_TX_30M-5G



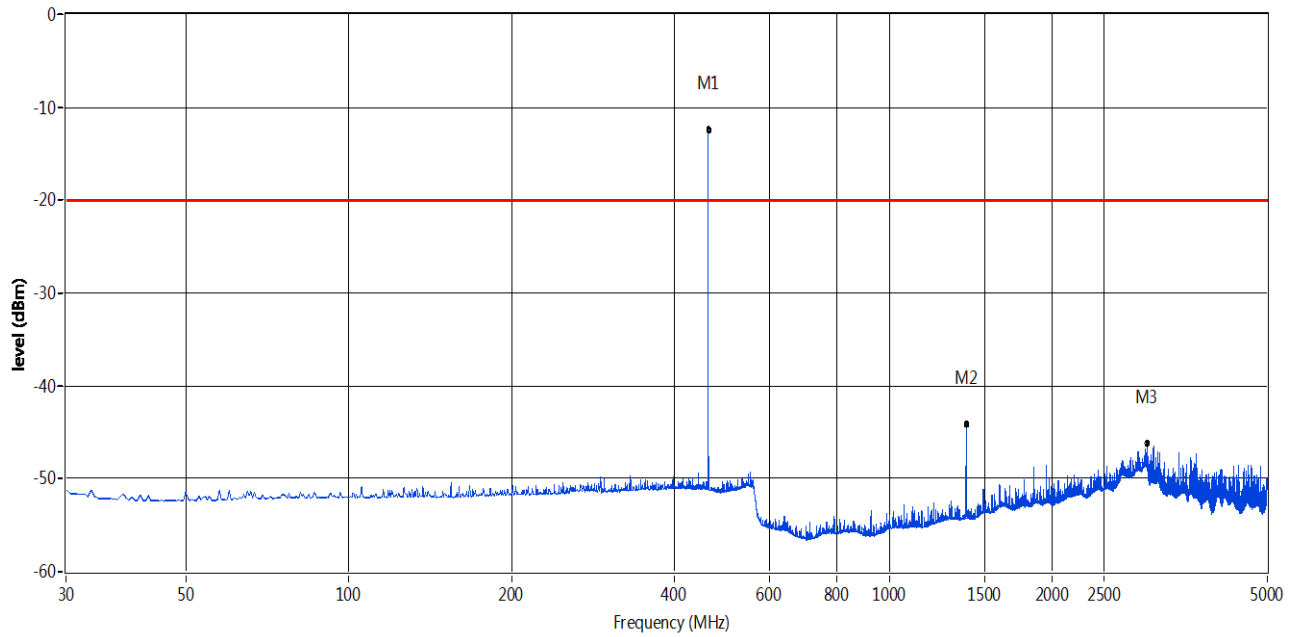
Frequency	Peak	Factor	PK Limit	Margin	Verdict
811.914	-46.01	9.50	-20.0	26.01	Pass
3005.997	-46.58	9.44	-20.0	26.58	Pass



CH 2

Model 1

FCC Test Case_CSE_Part 90_TX_30M-5G



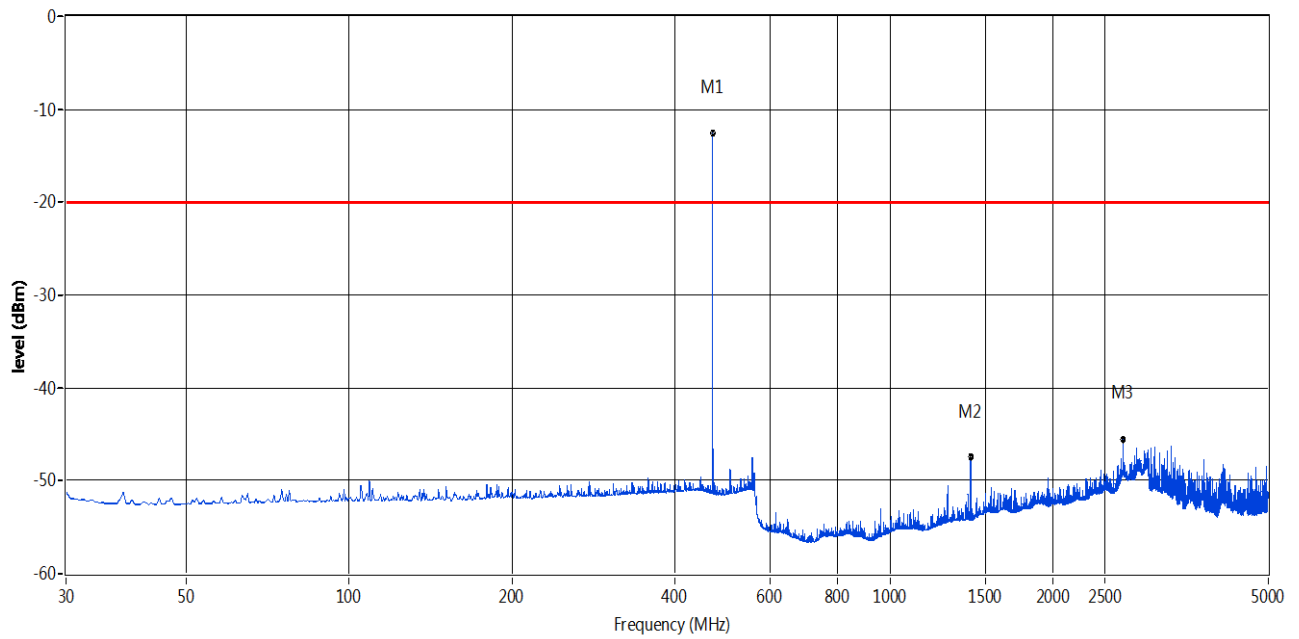
Frequency	Peak	Factor	PK Limit	Margin	Verdict
1359.835	-44.10	10.60	-20.0	24.10	Pass
2994.003	-46.16	12.70	-20.0	26.16	Pass



CH 3

Model 1

FCC Test Case_CSE_Part 90_TX_30M-5G



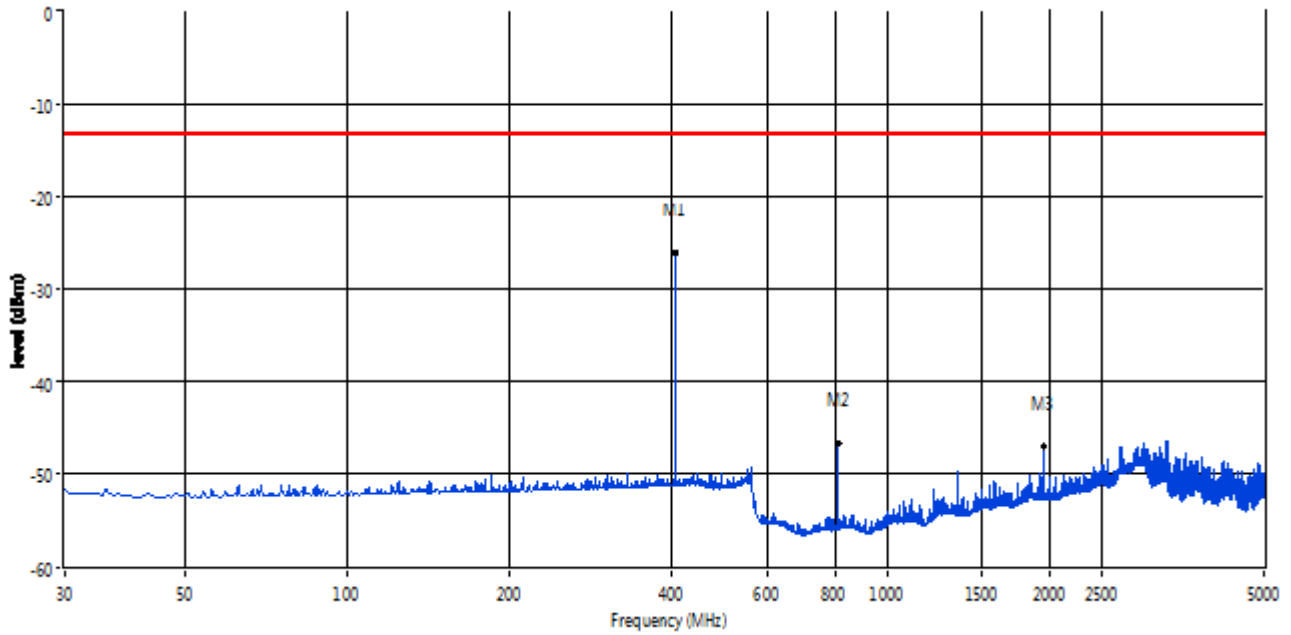
Frequency	Peak	Factor	PK Limit	Margin	Verdict
1409.748	-47.50	10.59	-20.0	27.50	Pass
2699.136	-45.55	12.26	-20.0	25.55	Pass



CH 1

Model 3

RCC Test Case CSE Part90 TX 30M-5G



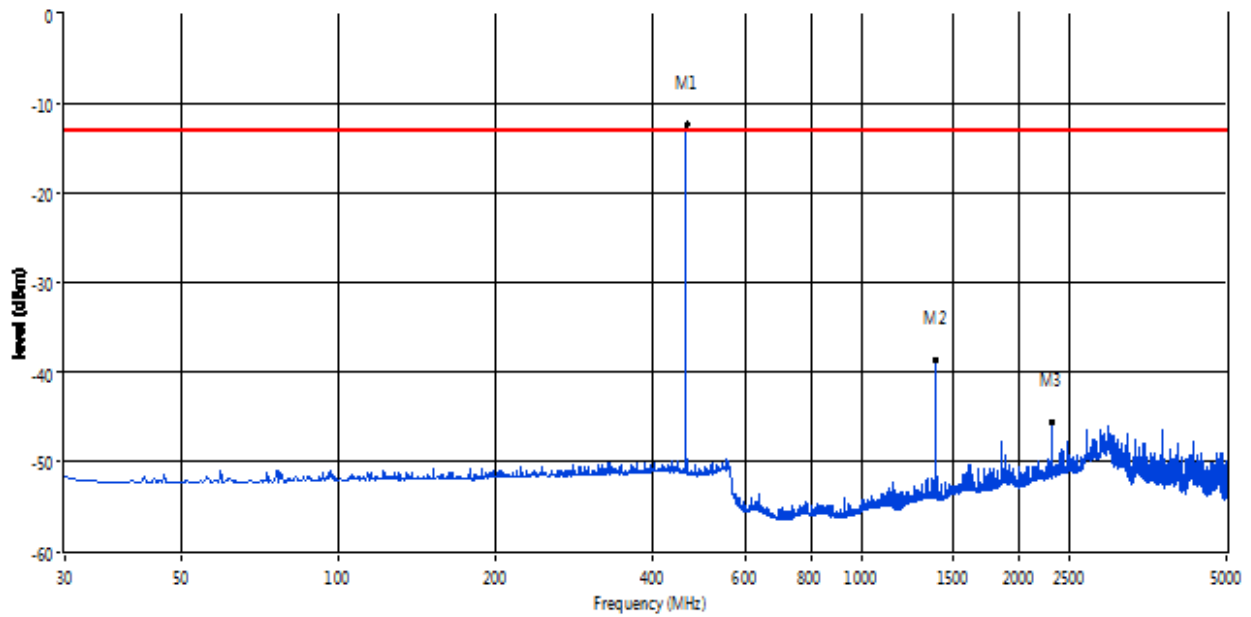
Frequency	Peak	Factor	PK Limit	Margin	Verdict
812.186	-46.63	9.50	-13.0	33.63	Pass
1951.524	-47.02	11.54	-13.0	34.02	Pass



CH 2

Model 3

RCC Test Case CSE Part90 TX 30M-5G



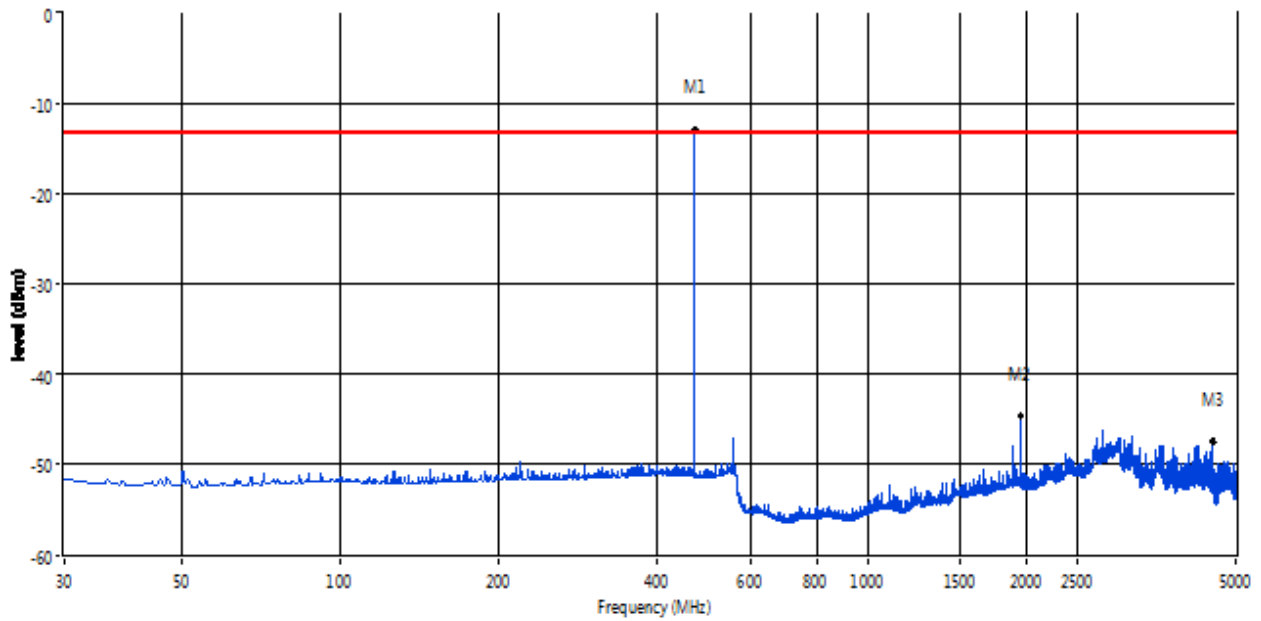
Frequency	Peak	Factor	PK Limit	Margin	Verdict
1360.214	-38.65	10.60	-13.0	25.65	Pass
2312.344	-45.49	11.71	-13.0	32.49	Pass



CH 3

Model 3

FCC Test Case CSE Part90 TX 30M-5G



Frequency	Peak	Factor	PK Limit	Margin	Verdict
1948.526	-44.62	11.47	-13.0	31.62	Pass
4520.240	-47.48	9.72	-13.0	34.48	Pass

8. FREQUENCY STABILITY

8.1 PROVISIONS APPLICABLE

- 1) According to FCC Part 2 Section 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30°C to +60°C centigrade.
- 2) According to FCC Part 2 Section 2.1055 (a) (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 85 to 115 percent of the nominal value.
- 4) According to §90.213, the frequency stability limit is 1.5 ppm for 12.5KHz channel separation

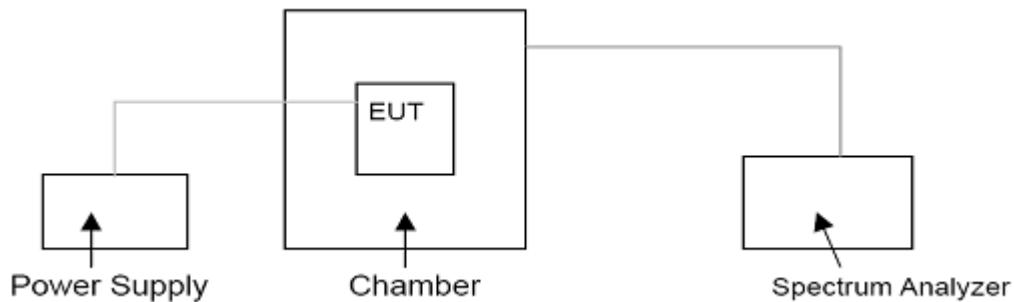
Frequency Range (MHz)	Channel Bandwidth (KHz)	Frequency Tolerance (ppm)		
		Fixed and Base Stations	Mobile Stations	
			> 2 W	≤ 2 W
150-174 MHz	6.25	1.0	2.0	2.0
	12.5	2.5	5.0	5.0
	25	5.0	5.0	50.0*
421-512 MHz	6.25	0.5	1.0	1.0
	12.5	1.5	2.5	2.5
	25	2.5	5.0	5.0

- Stations operating in the 154.45 to 154.49 MHz or the 173.2 to 173.4 MHz bands must have a frequency stability of 5 ppm.
- Paging transmitters operating on paging-only frequencies must operate with frequency stability of 5 ppm in the 150-174 MHz band and 2.5 ppm in the 421-512 MHz band.

8.2 MEASUREMENT PROCEDURE

- a. The EUT was connected to the Spectrum Analyzer.
- b. The EUT was set in the climate chamber and connected to an external DC power supply
- c. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded.
- d. 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 BLOCK DIAGRAM





8.4 TEST RESULT

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 1	25	406.1125	406.1129	0.985	2.5ppm	PASS
	-20	406.1125	406.1126	0.246		
	-10	406.1125	406.1127	0.492		
	0	406.1125	406.1131	1.477		
	10	406.1125	406.1125	0.000		
	20	406.1125	406.1128	0.739		
	30	406.1125	406.1127	0.492		
	40	406.1125	406.1129	0.985		
	50	406.1125	406.1133	1.970		

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 1	25	453.0125	453.0128	0.662	2.5ppm	PASS
	-20	453.0125	453.0120	-1.104		
	-10	453.0125	453.0124	-0.221		
	0	453.0125	453.0129	0.883		
	10	453.0125	453.0128	0.662		
	20	453.0125	453.0126	0.221		
	30	453.0125	453.0123	-0.441		
	40	453.0125	453.0131	1.324		
	50	453.0125	453.0127	0.441		

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 1	25	469.9875	469.9879	0.851	2.5ppm	PASS
	-20	469.9875	469.9875	0.000		
	-10	469.9875	469.9881	1.277		
	0	469.9875	469.9879	0.851		
	10	469.9875	469.9877	0.426		
	20	469.9875	469.9877	0.426		
	30	469.9875	469.9879	0.851		
	40	469.9875	469.9883	1.702		
	50	469.9875	469.9880	1.064		



Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 3	25	406.1250	406.1251	0.246	5ppm	PASS
	-20	406.1250	406.1254	0.985		
	-10	406.1250	406.1255	1.231		
	0	406.1250	406.1252	0.492		
	10	406.1250	406.1251	0.246		
	20	406.1250	406.1253	0.739		
	30	406.1250	406.1252	0.492		
	40	406.1250	406.1253	0.739		
	50	406.1250	406.1249	-0.246		

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 3	25	453.0250	453.0250	0.000	5ppm	PASS
	-20	453.0250	453.0250	0.000		
	-10	453.0250	453.0251	0.221		
	0	453.0250	453.0251	0.221		
	10	453.0250	453.0253	0.662		
	20	453.0250	453.0252	0.441		
	30	453.0250	453.0250	0.000		
	40	453.0250	453.0251	0.221		
	50	453.0250	453.0253	0.662		

Operation Mode	Condition (°C)	Nominal Frequency (MHz)	Measured Frequency (MHz)	ppm	Limit	Result
Mode 3	25	469.975	469.9750	0.000	5ppm	PASS
	-20	469.975	469.9752	0.426		
	-10	469.975	469.9751	0.213		
	0	469.975	469.9752	0.426		
	10	469.975	469.9753	0.638		
	20	469.975	469.9750	0.000		
	30	469.975	469.9750	0.000		
	40	469.975	469.9751	0.213		
	50	469.975	469.9751	0.213		



9. TRANSMITTER FREQUENCY BEHAVIOR

9.1 PROVISIONS 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.

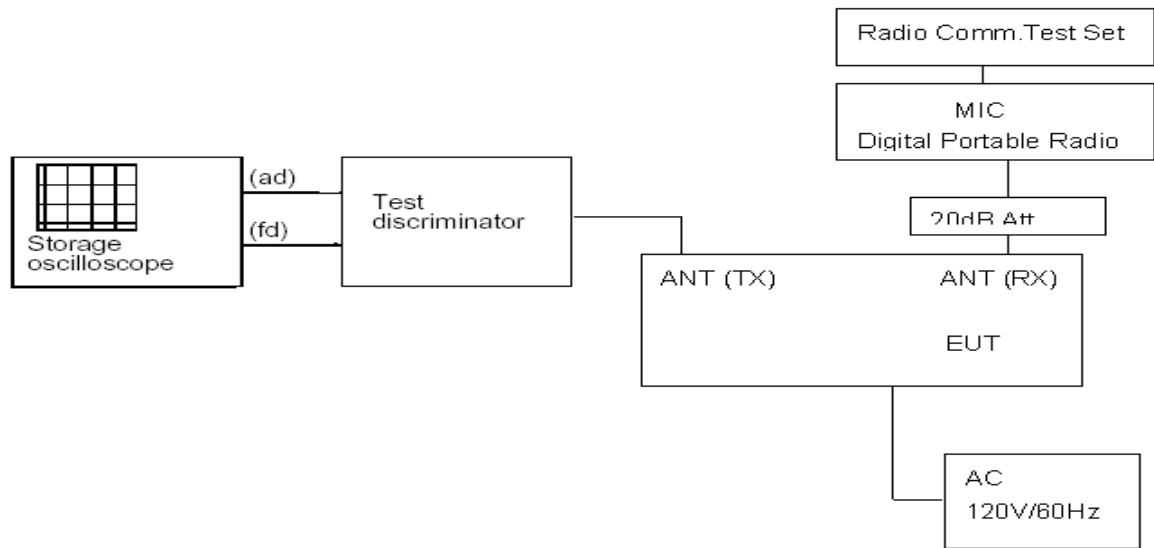
9.2 MEASUREMENT PROCEDURE

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;
- Connect DUT into Test discriminator and Storage Oscilloscope and keep DUT stats ON;
- Inut 1KHz signal into digital portable radio;
- 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;
- Keep the digital protable radio in OFF state and Key the PTT of digital portable radio;
Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be
- maintained within the allowable limits during the periods t_1 and t_2 ,and shall also remain within limits following t_2 ;
- 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.
- Keep the digital portable radio in ON state and Unkey the PTT of digital portable radio;
- Observe the stored oscilloscope of modulation domain analyzer.The signal trace shall be maintained within the allowable limits during the period t_3



9.3 TEST SETUP BLOCK DIAGRAM

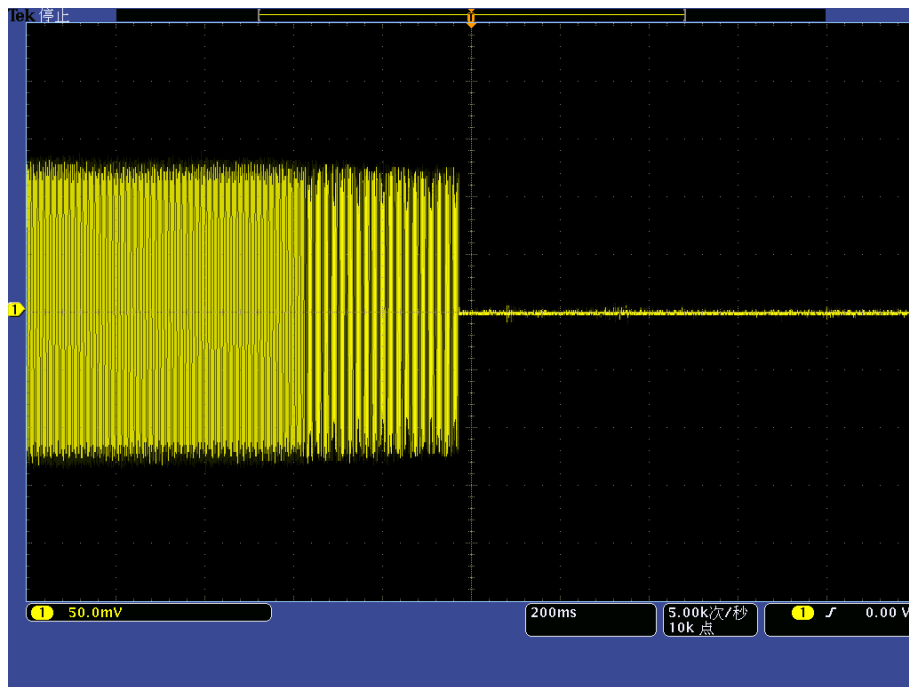




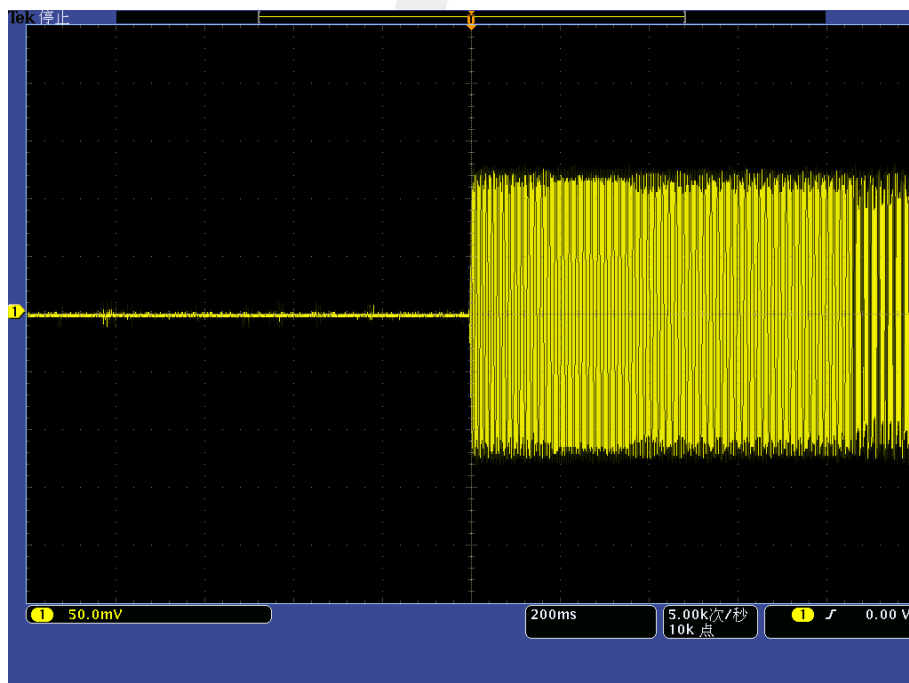
9.4 TEST RESULT

Mode 1

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



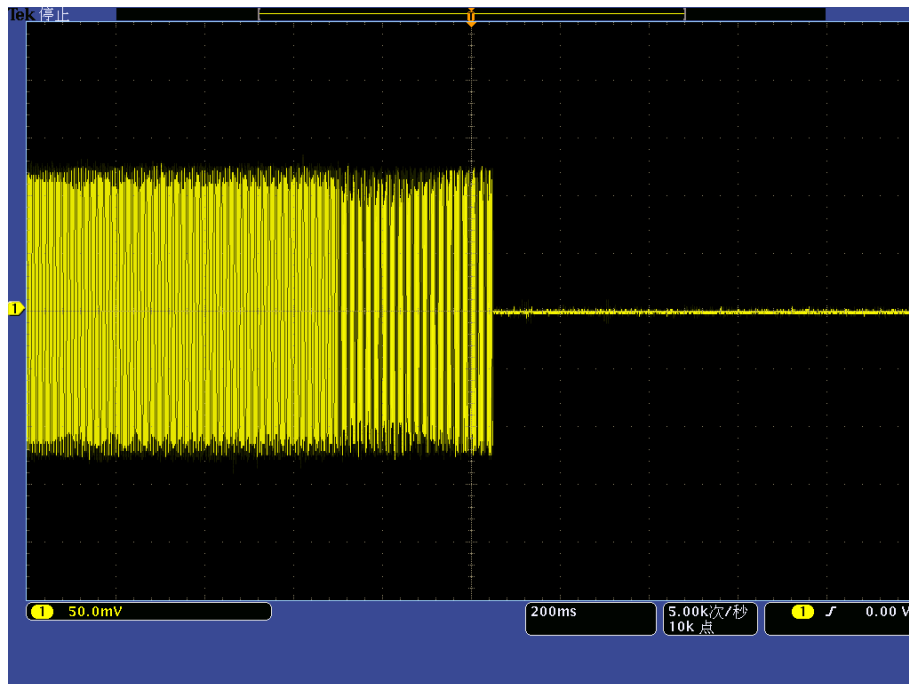
Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation-----On – Off



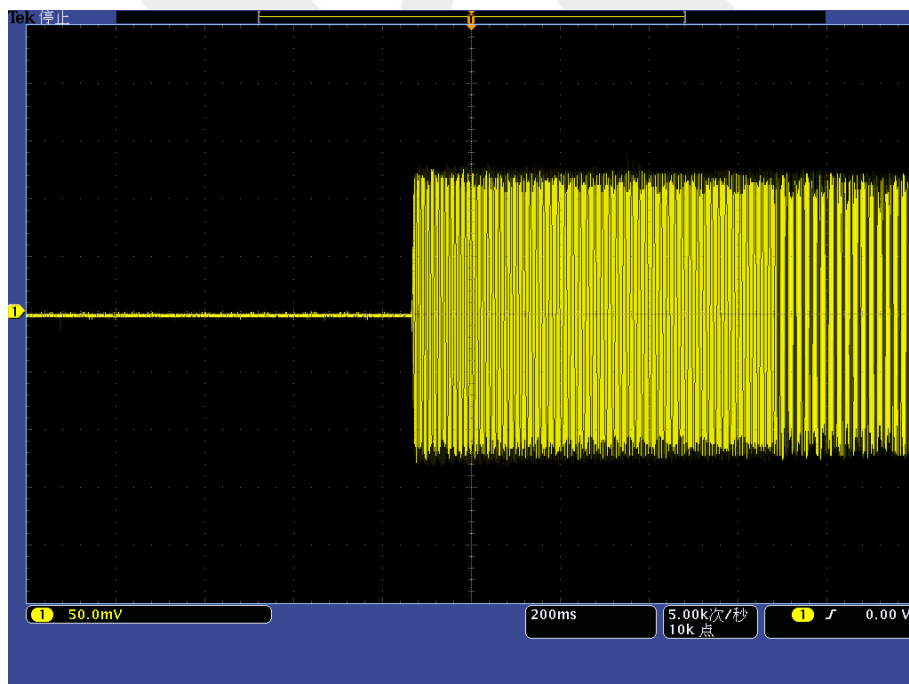


Mode 2

Transmitter Frequency Behaviour @ 25.0 KHz Channel Separation-----Off – On



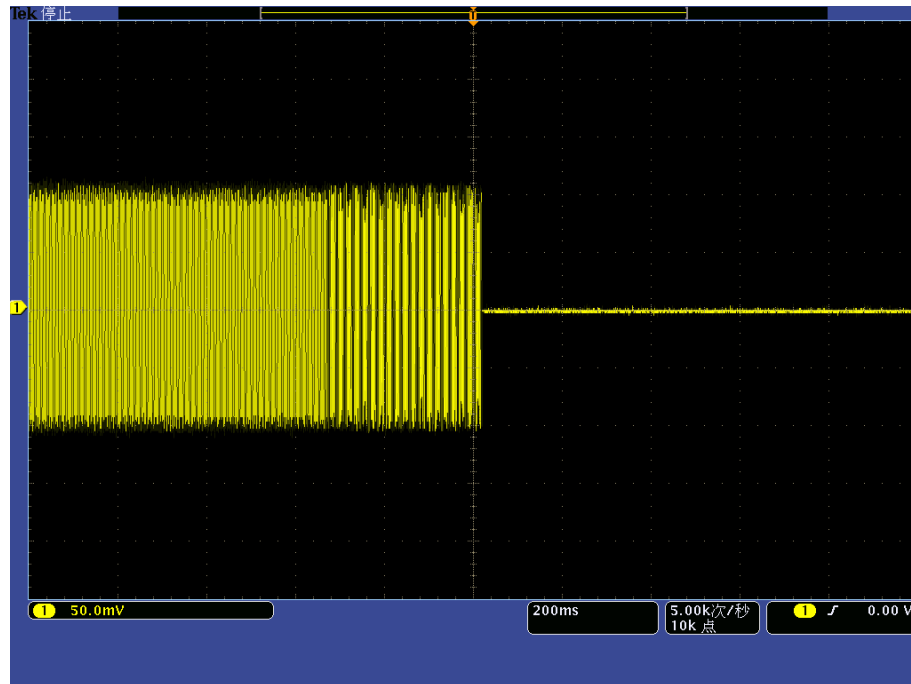
Transmitter Frequency Behaviour @ 25.0 KHz Channel Separation-----On – Off



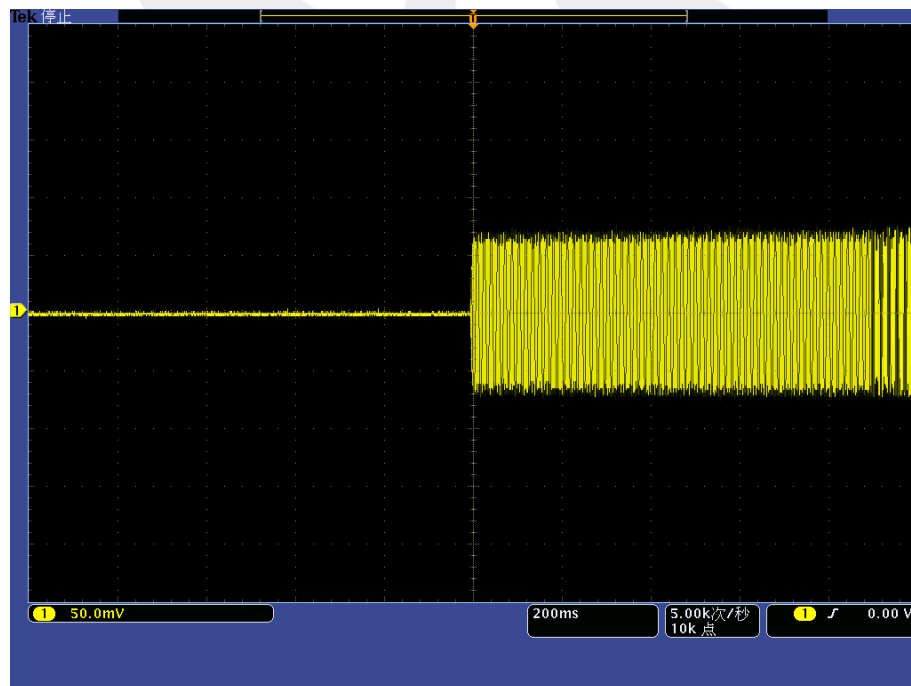


Mode 3

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



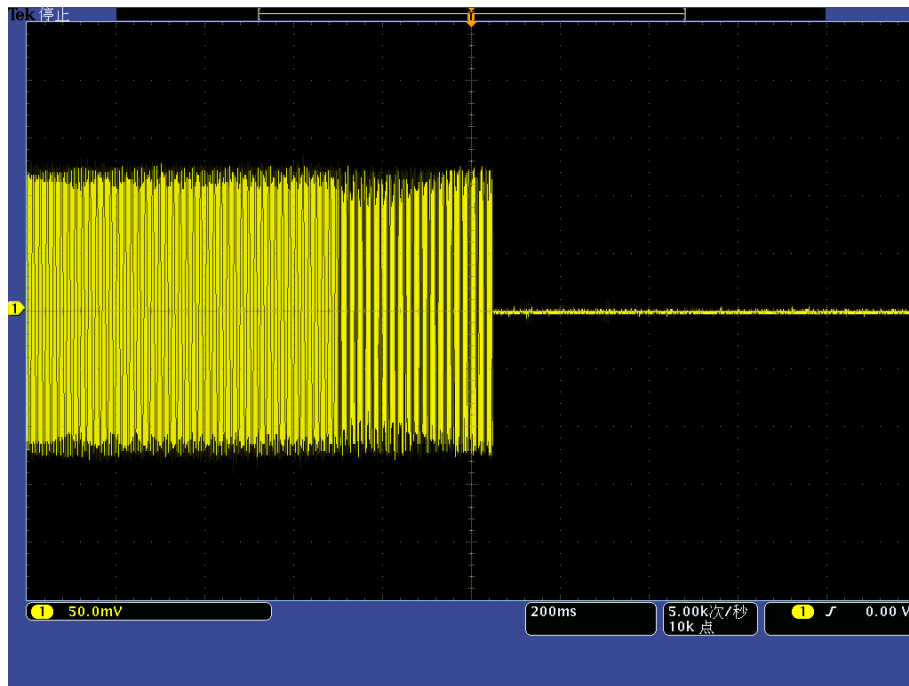
Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation-----On – Off



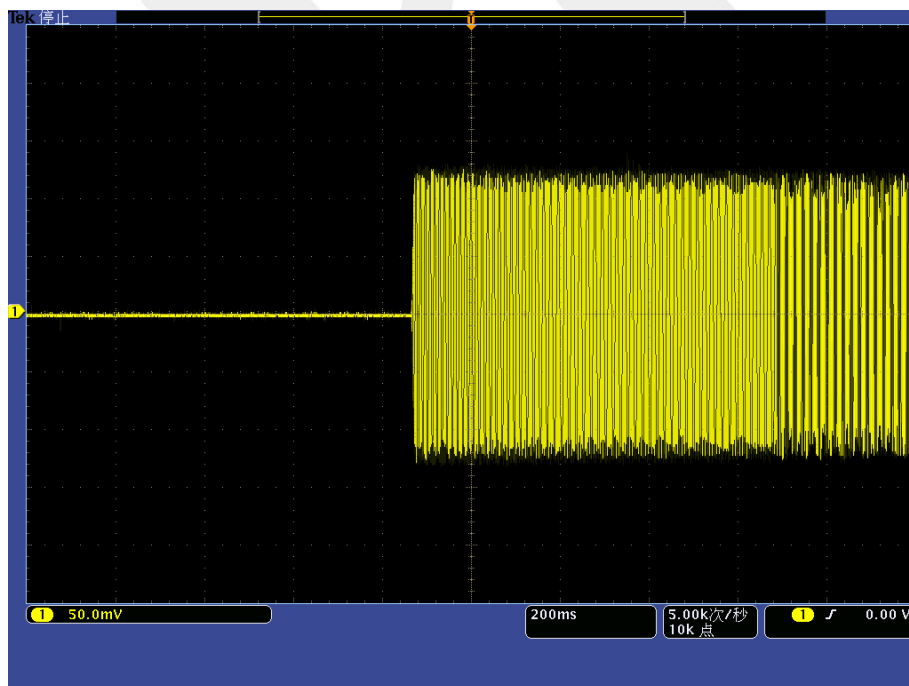


Mode 4

Transmitter Frequency Behaviour @ 25.0 KHz Channel Separation-----Off – On



Transmitter Frequency Behaviour @ 25.0 KHz Channel Separation-----On – Off





10. MODULATION CHARACTERISTIC

10.1 APPLIED PROCEDURES / 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.

10.2 TEST PROCEDURE

The test procedure please reference ANSI C63.26-2015.

10.3 TEST RESULT

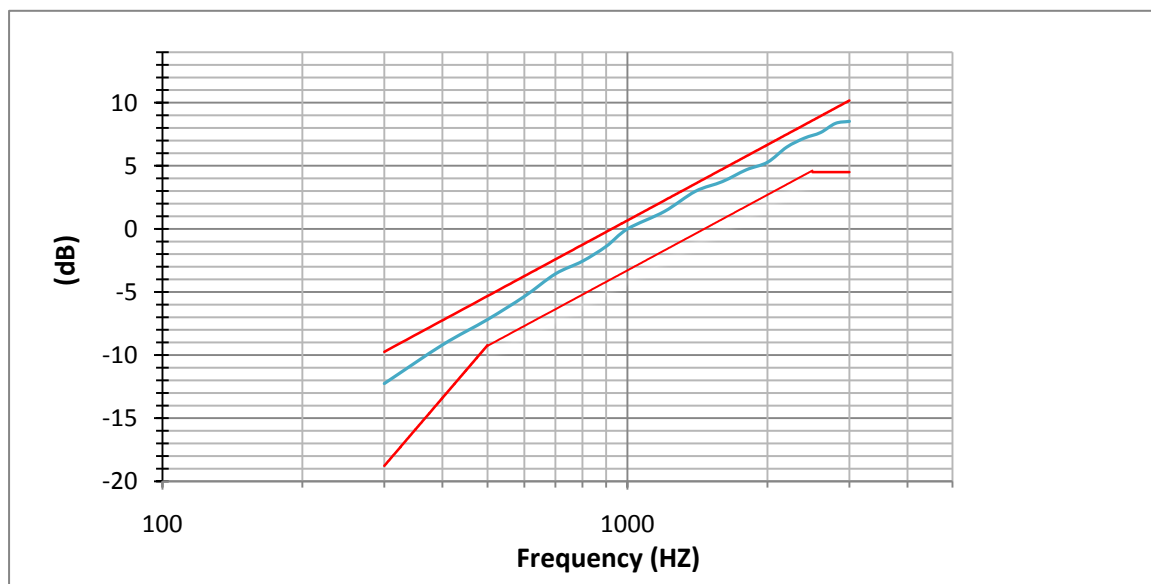




10.3.1 Audio Frequency Response

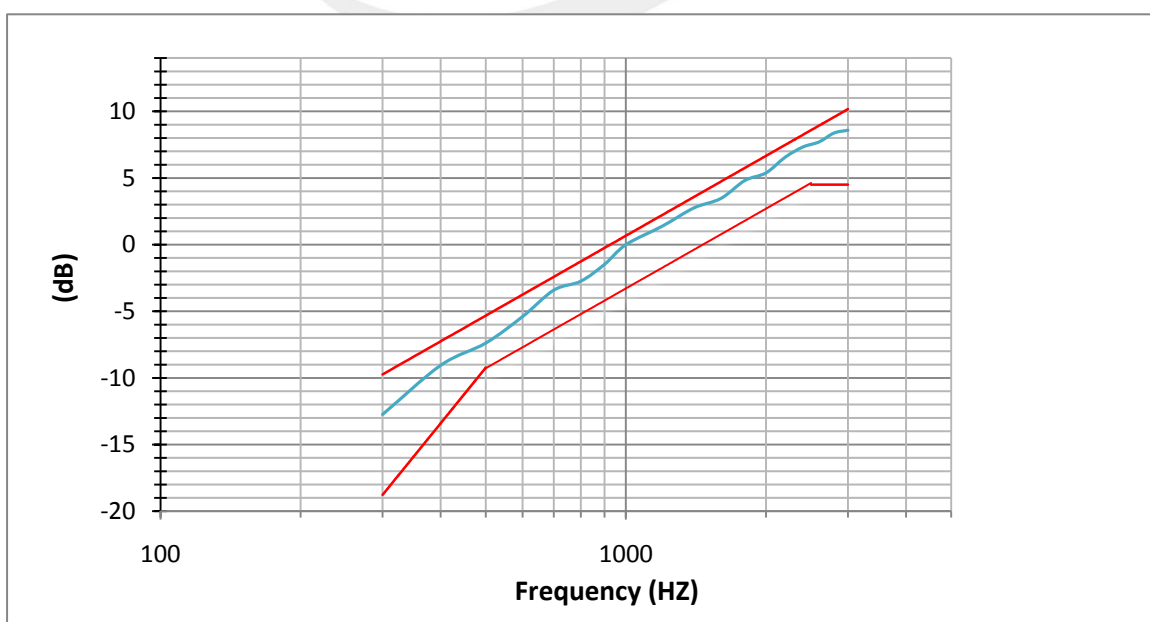
Mode 1(Carrier Frequency:453.0125,Channel Separation:12.5kHz,High Power)

Audio Frequency	Audio Frequency Response	Result
(Hz)	(dB)	
300	-12.25	
400	-9.19	
500	-7.18	
600	-5.35	
700	-3.56	
800	-2.56	
900	-1.38	
1000	0.00	
1200	1.38	
1400	2.98	
1600	3.75	
1800	4.68	
2000	5.28	
2200	6.48	
2400	7.19	
2600	7.63	
2800	8.36	
3000	8.52	



**Mode 3**(Carrier Frequency:453.025,Channel Separation:25kHz,High Power)

Audio Frequency	Audio Frequency Response	Result
(Hz)	(dB)	
300	-12.74	
400	-9.05	
500	-7.38	
600	-5.39	
700	-3.41	
800	-2.74	
900	-1.47	
1000	0.00	
1200	1.41	
1400	2.76	
1600	3.47	
1800	4.81	
2000	5.39	
2200	6.57	
2400	7.33	
2600	7.71	
2800	8.38	
3000	8.59	

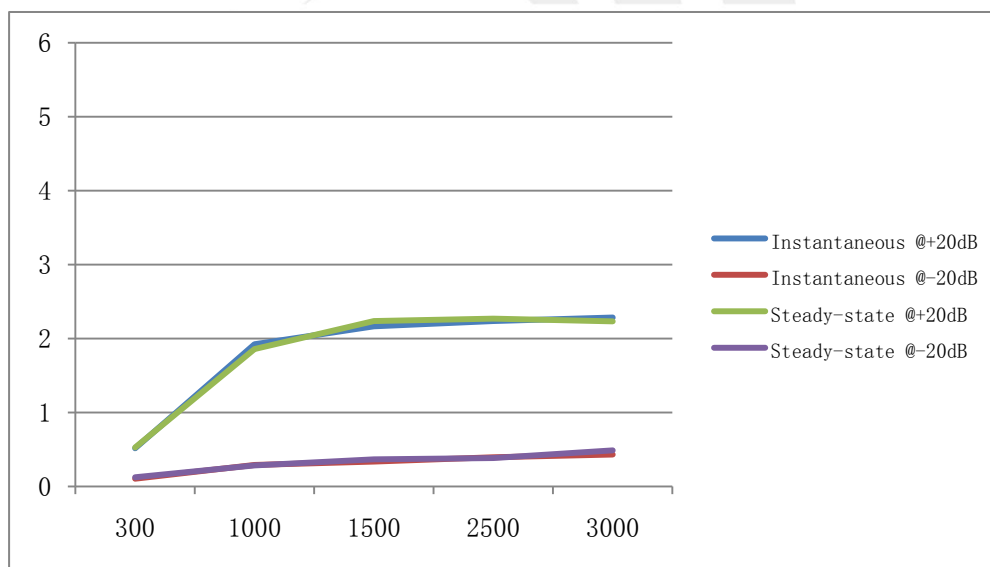




10.3.2 Modulation Limiting

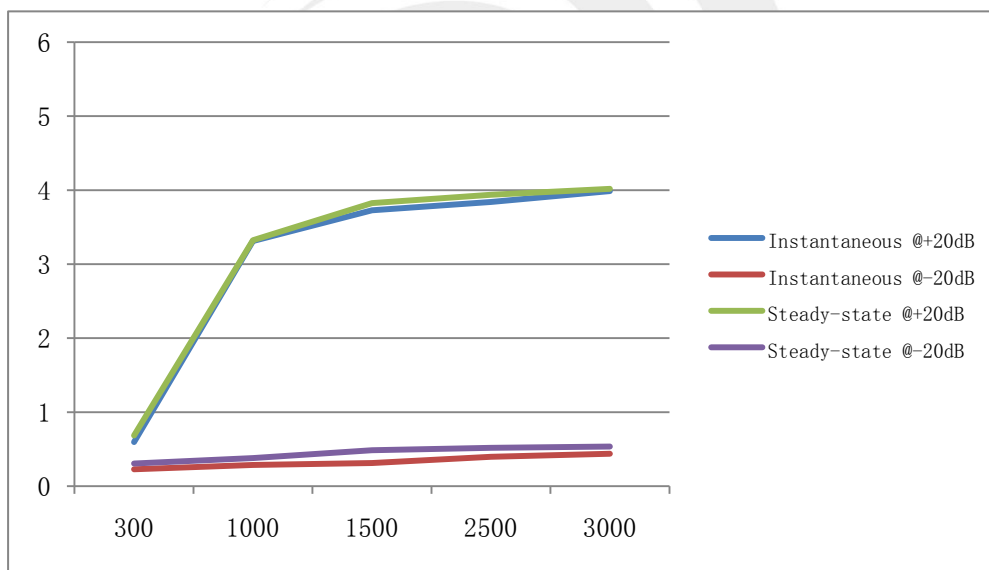
Mode 1(Carrier Frequency:453.0125,Channel Separation:12.5kHz,High Power)

Audio Frequency	Instantaneous		Steady-state		Limit (kHz)	Result
(Hz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)		
300	0.517	0.104	0.528	0.125	±2.5	Pass
1000	1.924	0.291	1.858	0.285		
1500	2.165	0.336	2.236	0.367		
2500	2.236	0.395	2.269	0.385		
3000	2.285	0.431	2.233	0.488		



**Mode 3**(Carrier Frequency:453.025,Channel Separation:25kHz,High Power)

Audio Frequency	Instantaneous		Steady-state		Limit (kHz)	Result
(Hz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)	Deviation (@+20dB) (kHz)	Deviation (@-20dB) (kHz)		
300	0.597	0.229	0.684	0.307	±5	Pass
1000	3.312	0.286	3.324	0.379		
1500	3.728	0.312	3.824	0.486		
2500	3.839	0.397	3.937	0.518		
3000	3.987	0.438	4.018	0.536		

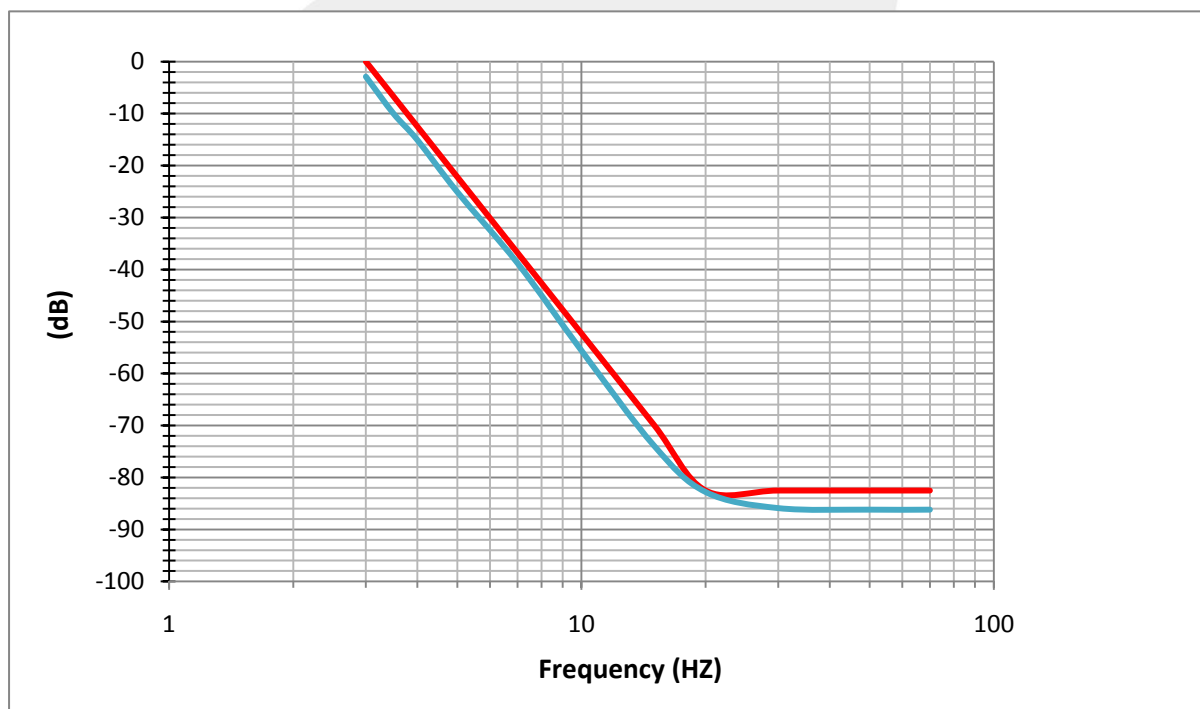




10.3.3 Audio Low Pass Filter Response

Mode 1(Carrier Frequency:453.0125,Channel Separation:12.5kHz,High Power)

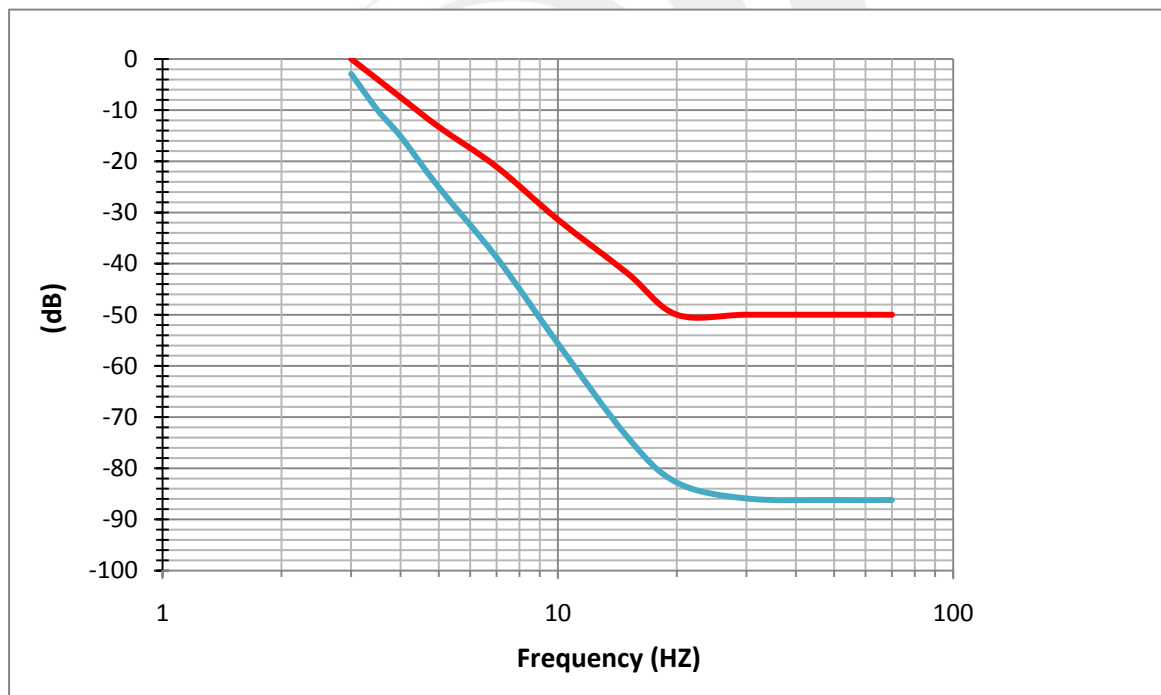
Audio Frequency (KHz)	Response Attenuation (dB)	Limit	Result
3	-3.1	0	Pass
3.5	-10	-6.7	
4	-15.4	-12.5	
5	-25.6	-22.2	
7	-39.6	-36.8	
10	-55.5	-52.3	
15	-74.2	-69.9	
20	-85.8	-82.5	
30	-86.5	-82.5	
50	-86.6	-82.5	
70	-86.7	-82.5	





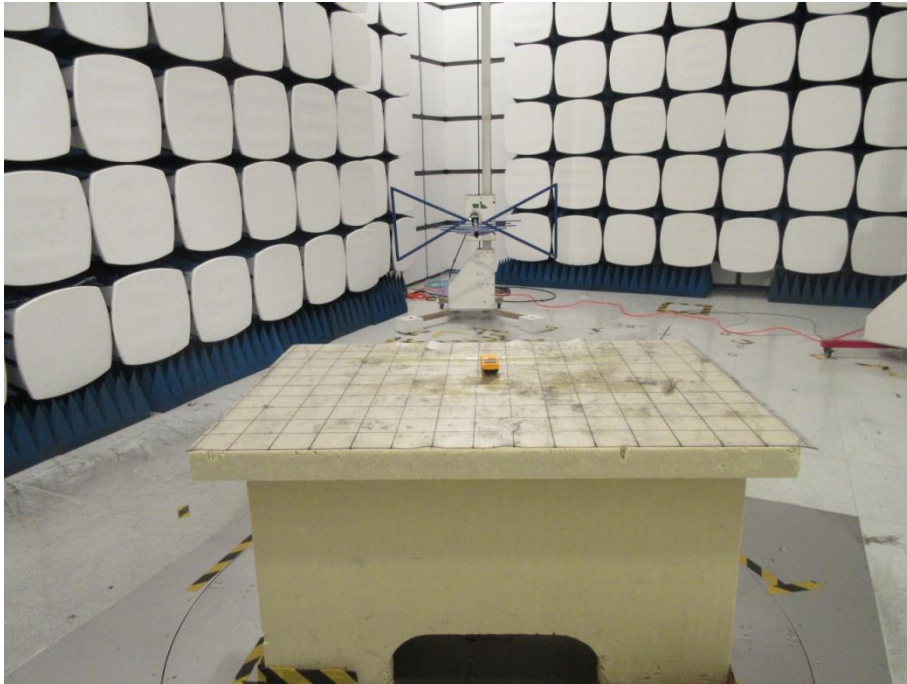
Mode 3(Carrier Frequency:453.025,Channel Separation: 25kHz,High Power)

Audio Frequency (KHz)	Response Attenuation (dB)	Limit	Result
3	-2.9	0	Pass
3.5	-10	-4.0	
4	-15.1	-7.5	
5	-25.1	-13.3	
7	-38.8	-21.1	
10	-55.6	-31.4	
15	-73.9	-41.9	
20	-82.8	-50	
30	-85.9	-50	
50	-86.2	-50	
70	-86.2	-50	

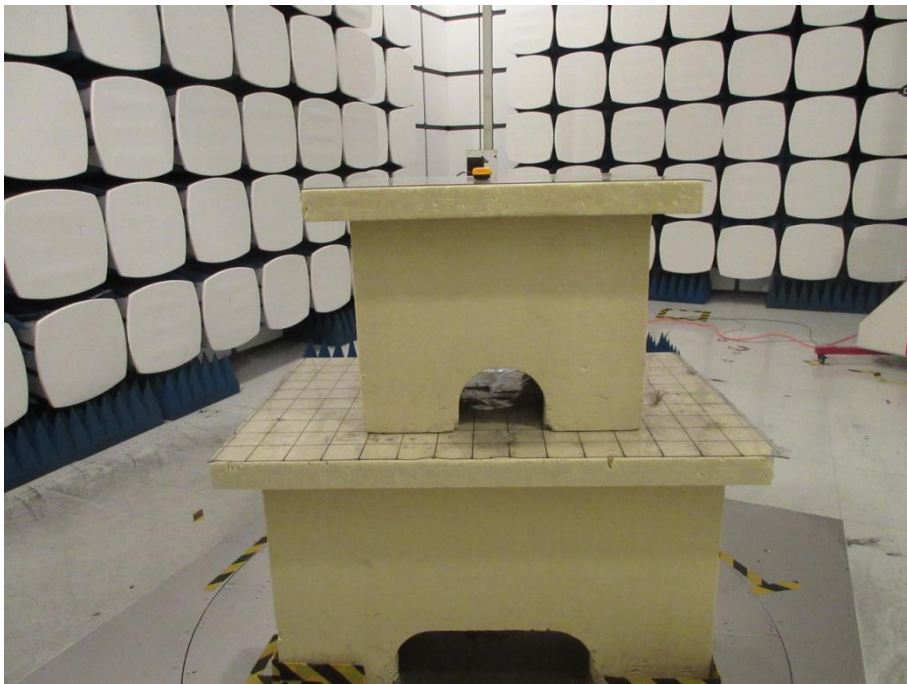


11. PHOTOS OF TEST SETUP

Radiated Measurement Photos 30MHz- 1GHz



Above 1GHz



*****END OF THE REPORT*****