FCC PART 22，PART 74 AND PART 90 TEST REPORT

For

Tait Limited

535 Wairakei Rd 1645 Christchurch New Zealand

FCC ID: CASTPEHGE

Report Type:	Product Name:
Original Report	Two way radio

Report Number:	RDG170810003-00D
Report Date:	2017-11-28
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***Tait Limited***'s product, model number: *T03-00303-GCAA* ***(FCC ID: CASTPEHGE)*** *(Type code: TPEHGE)* (the "EUT") in this report was a *Two way radio*, which was measured approximately: 6.6 cm (L) x 3.6 cm (W) x 14.5 cm (H), DC7.4V from Battery or DC 12V from adapter.

Adapter Information:
Model:ICP30-120-2000
Input: AC100-240V, 50/60Hz, 0.8A
Output:DC 12V, 2000mA

Note: The series product, models T03-00303-GBAA;T03-00303-GAAA and T03-00303-GCAA are electrically identical, we selected T03-00303-GCAA for all testing, and all models for radiation test only, the detail of the difference was explained in the attached declaration letter.

**All measurement and test data in this report was gathered from production sample serial number: 170810003 (Assigned by BACL,Dongguan). The EUT was received on 2017-08-10.*

Objective

This test report is prepared on behalf of ***Tait Limited*** in accordance with Part 2, Part 22,74 and Part 90 of the Federal Communications Commission rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: CASTPEHGE.
FCC Part 15C DTS submissions with FCC ID: CASTPEHGE.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, part 22, part 74 and Part 90

Applicable Standards: TIA-603-D.

The uncertainty of any RF tests which use conducted method measurement is ±3.17 dB, the uncertainty of any radiation on emissions measurement is:

30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G-6GHz:: ±5.13dB;
6G~25GHz: ±5.47dB;

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L5662). And accredited to ISO/IEC 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a test mode.

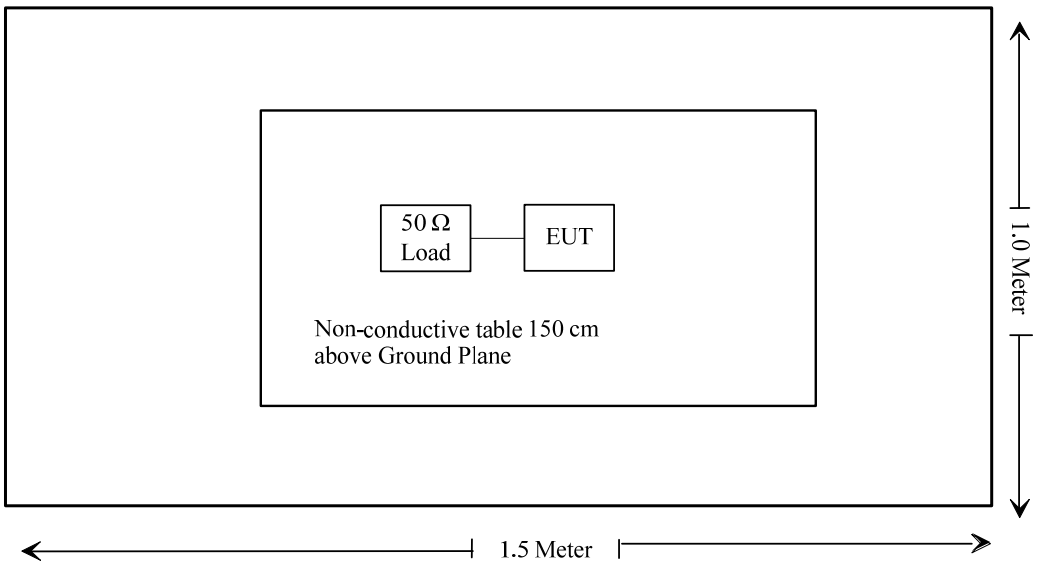
EUT Specification:

Operating Frequency Band	400-480MHz
Modulation Mode	FM/4FSK
Channel Spacing	12.5/25kHz
Rated Output Power	High: 4W Low: 1W

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
N/A	Terminal Load(50 Ω)	N/A	N/A
HP	RF Communications Test Set	8920A	00 235

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1310 and §2.1093	RF Exposure	Compliant
§ 2.1046 &§ 22.727& &§ 74.461&§90.205	RF Output Power	Compliant
§ 2.1047	Modulation Characteristic	Compliant
§ 2.1049& §22.357 & § 22.731 &§90.209 & §90.210 & §74.462	Occupied Bandwidth & Emission Mask	Compliant
§ 2.1051& §22.861 & §90.210& §74.462	Spurious Emission at Antenna Terminal	Compliant
§ 2.1053 & §22.861 & §90.210& §74.462	Spurious Radiated Emissions	Compliant
§2.1055 & § 22.355 & §90.213&§74.464	Frequency Stability	Compliant
§90.214	Transient Frequency Behavior	Compliant

FCC §1.1310 & §2.1093 - RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RDG170810003-20A.

FCC §2.1046 &§ 22.727& &§ 74.461&§90.205- RF OUTPUT POWER

Applicable Standard

FCC §2.1046, § 22.727, §74.461 and §90.205.

Test Procedure

Conducted RF Output Power:

TIA-603-D section 2.2.1

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer setting:

RBW	VBW
100 kHz	300 kHz

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	831259/019	2017-07-18	2018-7-18
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	Each Time	/
E-Microwave	RF Attenuator	20dB	20dB-1	Each Time	/
E-Microwave	RF Attenuator	20dB	20dB-2	Each Time	/
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.2 °C
Relative Humidity:	51%
ATM Pressure:	101.5 kPa

The testing was performed by Pean Zhu on 2017-08-28.

Test Result: Compliant. Please refer to following tables.

FCC Part 90:

Modulation	Channel Spacing (kHz)	f_c (MHz)	Conducted Output Power (W)	
			High	Low
FM	12.5	400.0125 Note 1	4.60	1.08
		453.2125	4.54	1.09
		479.9875	4.69	1.09
4FSK		400.0125 Note 1	4.51	1.10
		453.2125	4.65	1.09
		479.9875	4.62	1.11

FCC Part 22:

Modulation	Channel Spacing (kHz)	f_c (MHz)	Conducted Output Power (W)	
			High	Low
FM	12.5	454.0125	4.50	1.06
4FSK		454.0125	4.75	1.00
FM	25	454.2125	4.65	1.02

FCC Part 74:

Modulation	Channel Spacing (kHz)	f_c (MHz)	Conducted Output Power (W)	
			High	Low
FM	12.5	455.0125	4.06	0.99
	25	455.6625	4.25	1.12
4FSK	12.5	455.0125	4.21	1.05

Note: The rated high power is 4W (36 dBm) and low power is 1W (30 dBm).
Note 1: Not for FCC Review

FCC §2.1047 - MODULATION CHARACTERISTIC

Applicable Standard

FCC§2.1047

Test Procedure

Test Method: TIA/EIA-603 2.2.3

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
HP	RF Communications Test Set	8920A	00 235	2017-07-11	2018-07-11
LEADER	Millivoltmeter	LMV-181A	601788	2017-08-11	2018-08-10
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	Each Time	/
E-Microwave	RF Attenuator	20dB	20dB-1	Each Time	/
E-Microwave	RF Attenuator	20dB	20dB-2	Each Time	/
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26.2 °C
Relative Humidity:	51%
ATM Pressure:	101.5 kPa

The testing was performed by Pean Zhu on 2017-08-28.

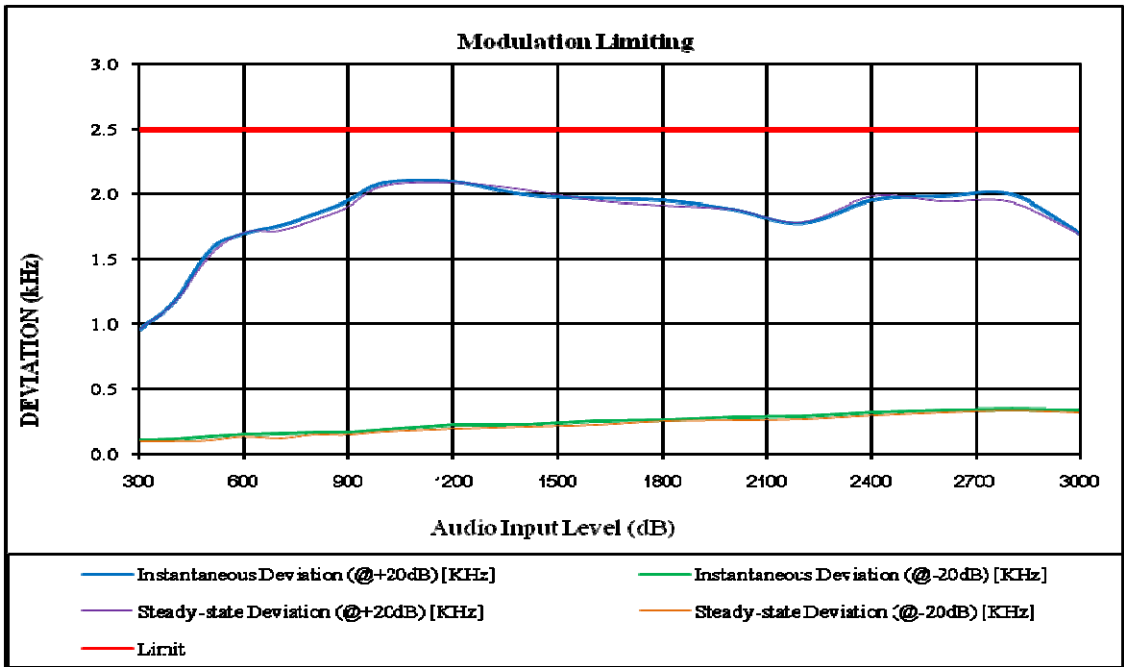
Test Result: Compliant. Please refer to following table and plots.

Part 90, FM, 12.5 kHz:

MODULATION LIMITING

Carrier Frequency: 453.2125 MHz, Channel Spacing = 12.5 kHz

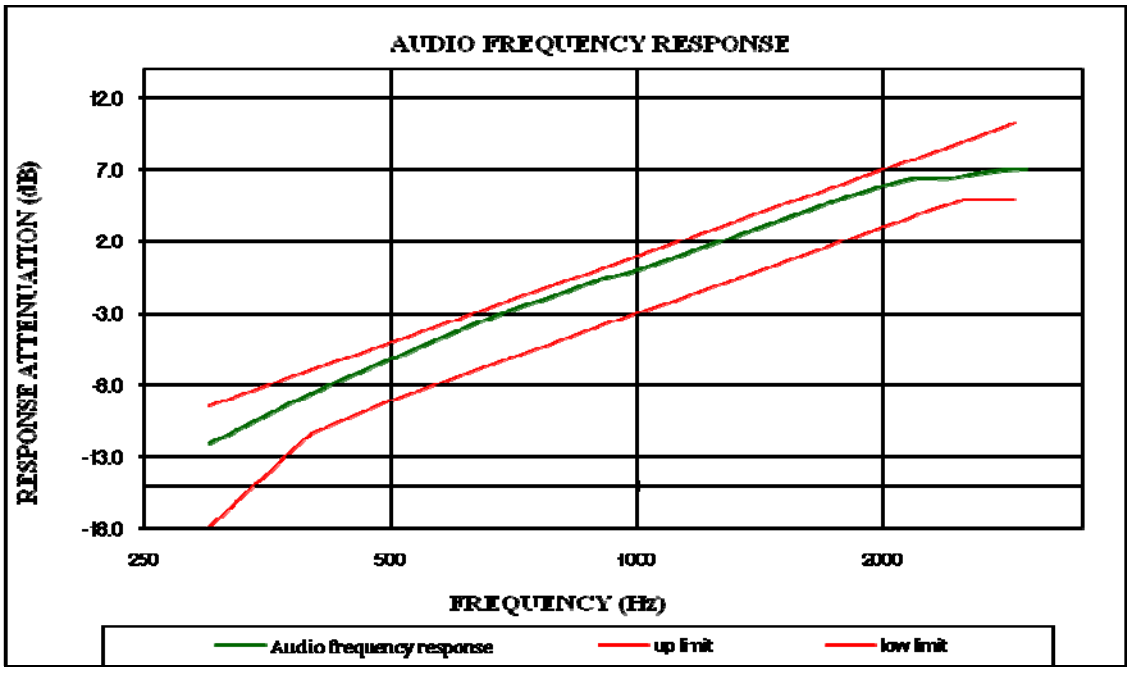
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	0.957	0.103	0.962	0.097	2.5
400	1.174	0.11	1.164	0.098	2.5
500	1.569	0.137	1.529	0.102	2.5
600	1.697	0.148	1.705	0.132	2.5
700	1.753	0.155	1.718	0.12	2.5
800	1.85	0.167	1.798	0.149	2.5
900	1.951	0.166	1.906	0.15	2.5
1000	2.089	0.191	2.063	0.174	2.5
1200	2.099	0.222	2.087	0.196	2.5
1400	1.996	0.228	2.035	0.214	2.5
1600	1.97	0.256	1.95	0.225	2.5
1800	1.953	0.261	1.917	0.254	2.5
2000	1.884	0.288	1.881	0.26	2.5
2200	1.777	0.293	1.784	0.269	2.5
2400	1.954	0.324	1.984	0.3	2.5
2600	1.981	0.338	1.946	0.322	2.5
2800	1.998	0.346	1.94	0.34	2.5
3000	1.697	0.341	1.688	0.325	2.5



Audio Frequency Response

Carrier Frequency: 453.2125 MHz, Channel Spacing = 12.5 kHz

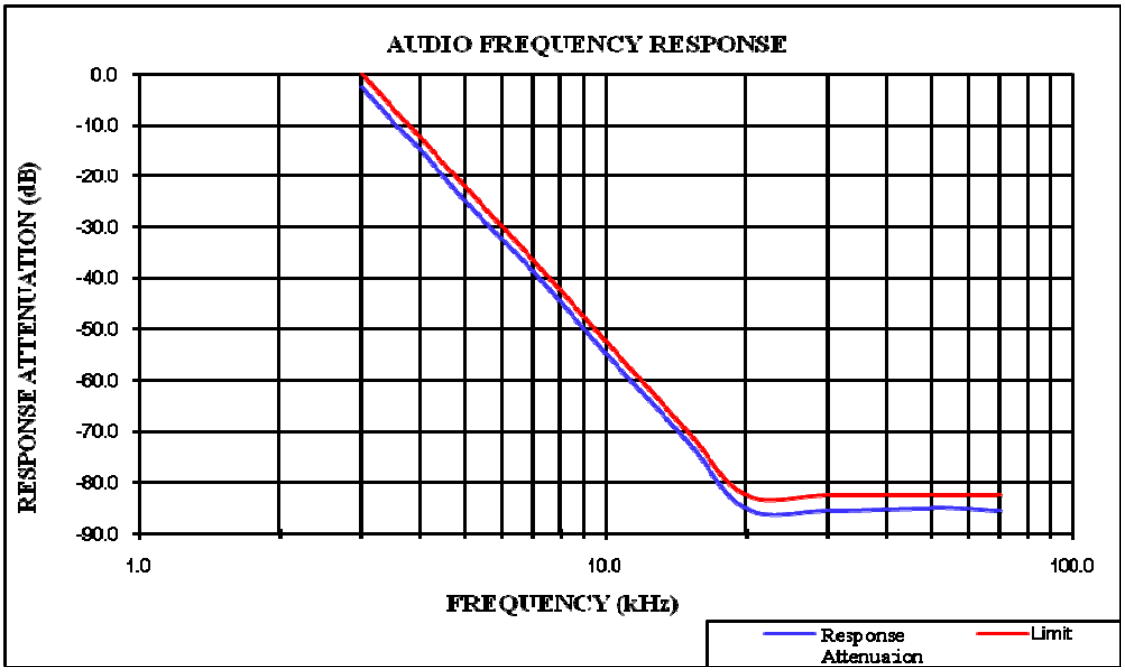
Audio Frequency	Response Attenuation
Hz	dB
300	-12.01
400	-8.52
500	-6.16
600	-4.28
700	-2.76
800	-1.72
900	-0.63
1000	0.00
1200	1.54
1400	2.89
1600	4.07
1800	5.09
2000	5.91
2200	6.41
2400	6.41
2600	6.72
2800	6.97
3000	7.04



Audio Frequency Low Pass Filter Response

Carrier Frequency: 453.2125 MHz, Channel Spacing = 12.5 kHz, high power level

Audio Frequency	Response Attenuation	Limit
kHz	dB	dB
3.0	-2.5	0.0
3.5	-9.3	-6.7
4.0	-14.7	-12.5
5.0	-25.0	-22.2
7.0	-38.9	-36.8
10.0	-54.6	-52.3
15.0	-71.9	-69.9
20.0	-85.2	-82.5
30.0	-85.6	-82.5
50.0	-85.0	-82.5
70.0	-85.5	-82.5

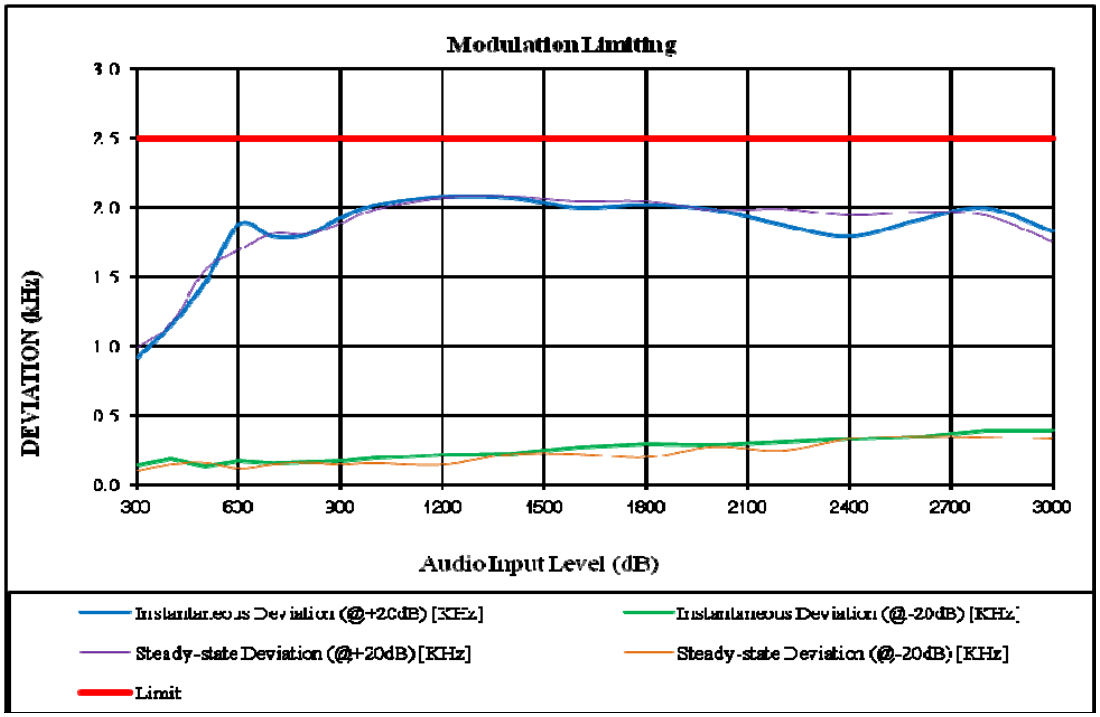


Part 22,FM, 12.5 kHz:

MODULATION LIMITING

Carrier Frequency: 454.0125 MHz, Channel Spacing = 12.5 kHz

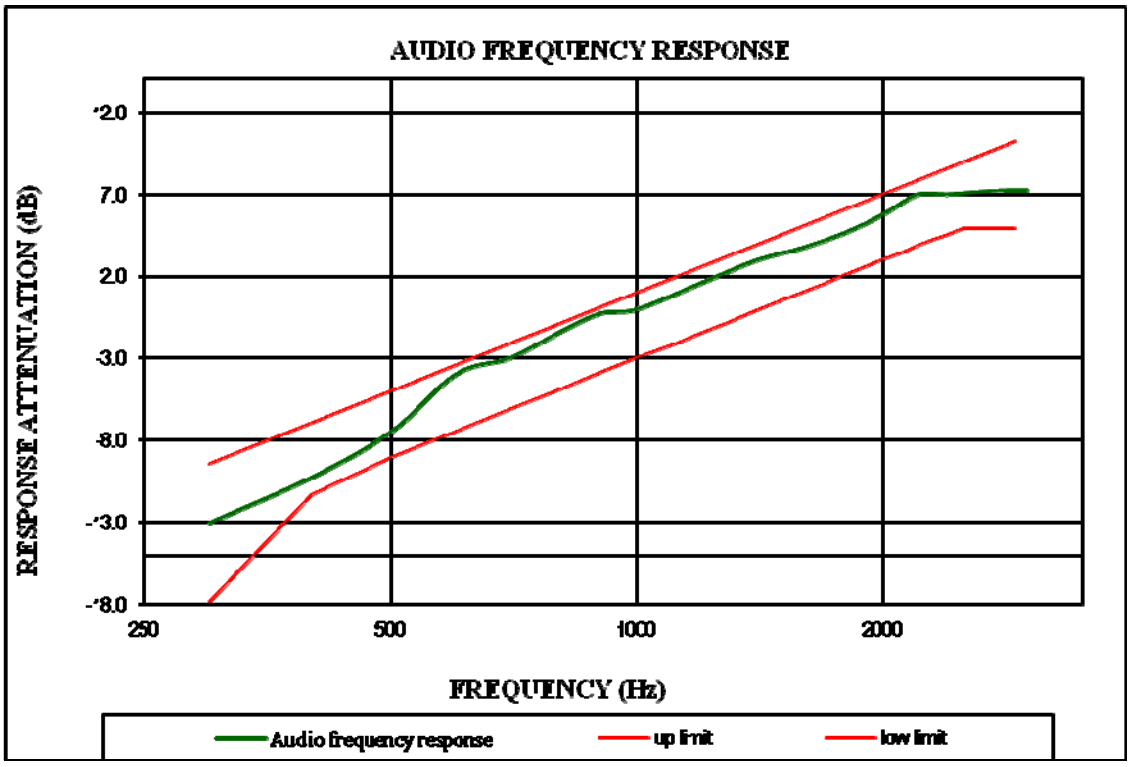
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	0.915	0.14	0.987	0.102	2.5
400	1.152	0.19	1.158	0.147	2.5
500	1.456	0.136	1.547	0.159	2.5
600	1.874	0.174	1.695	0.119	2.5
700	1.789	0.159	1.814	0.147	2.5
800	1.802	0.165	1.809	0.16	2.5
900	1.922	0.174	1.887	0.147	2.5
1000	2.011	0.195	1.987	0.158	2.5
1200	2.069	0.219	2.069	0.147	2.5
1400	2.064	0.229	2.078	0.222	2.5
1600	1.996	0.274	2.047	0.224	2.5
1800	2.014	0.296	2.047	0.199	2.5
2000	1.981	0.287	1.984	0.274	2.5
2200	1.874	0.309	1.992	0.247	2.5
2400	1.789	0.335	1.947	0.33	2.5
2600	1.905	0.348	1.968	0.352	2.5
2800	1.992	0.395	1.947	0.347	2.5
3000	1.825	0.39	1.756	0.333	2.5



Audio Frequency Response

Carrier Frequency: 454.0125 MHz, Channel Spacing = 12.5 kHz

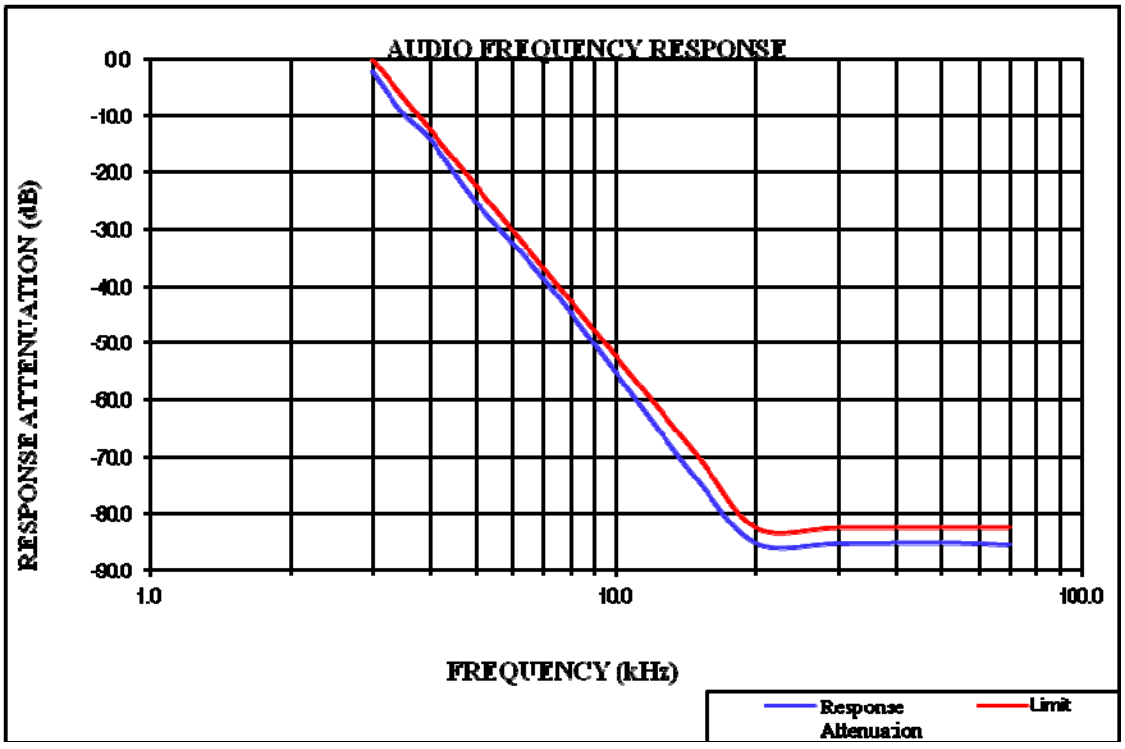
Audio Frequency	Response Attenuation
Hz	dB
300	-13.02
400	-10.25
500	-7.48
600	-3.96
700	-2.97
800	-1.45
900	-0.26
1000	0.00
1200	1.62
1400	2.99
1600	3.78
1800	4.69
2000	5.78
2200	6.99
2400	7.02
2600	7.15
2800	7.25
3000	7.26



Audio Frequency Low Pass Filter Response

Carrier Frequency: 454.0125 MHz, Channel Spacing = 12.5 kHz, high power level

Audio Frequency	Response Attenuation	Limit
kHz	dB	dB
3.0	-2.3	0.0
3.5	-9.7	-6.7
4.0	-14.3	-12.5
5.0	-25.2	-22.2
7.0	-38.7	-36.8
10.0	-55.2	-52.3
15.0	-74.3	-69.9
20.0	-85.2	-82.5
30.0	-85.3	-82.5
50.0	-85.1	-82.5
70.0	-85.5	-82.5

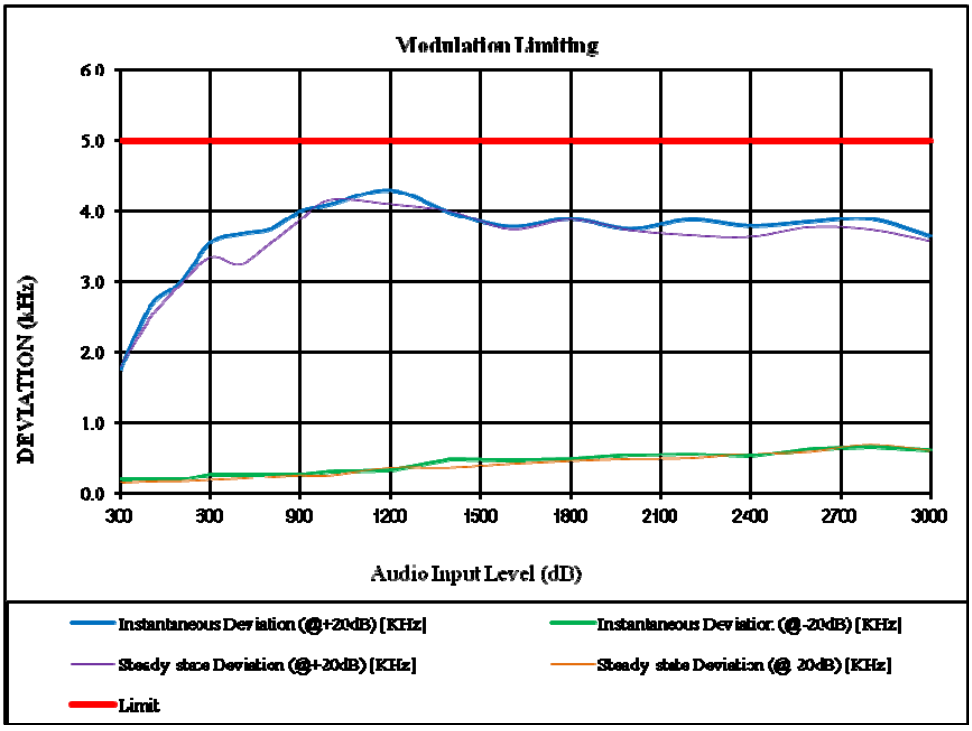


Part 22,FM, 25 kHz:

MODULATION LIMITING

Carrier Frequency: 454.2125 MHz, Channel Spacing = 25 kHz

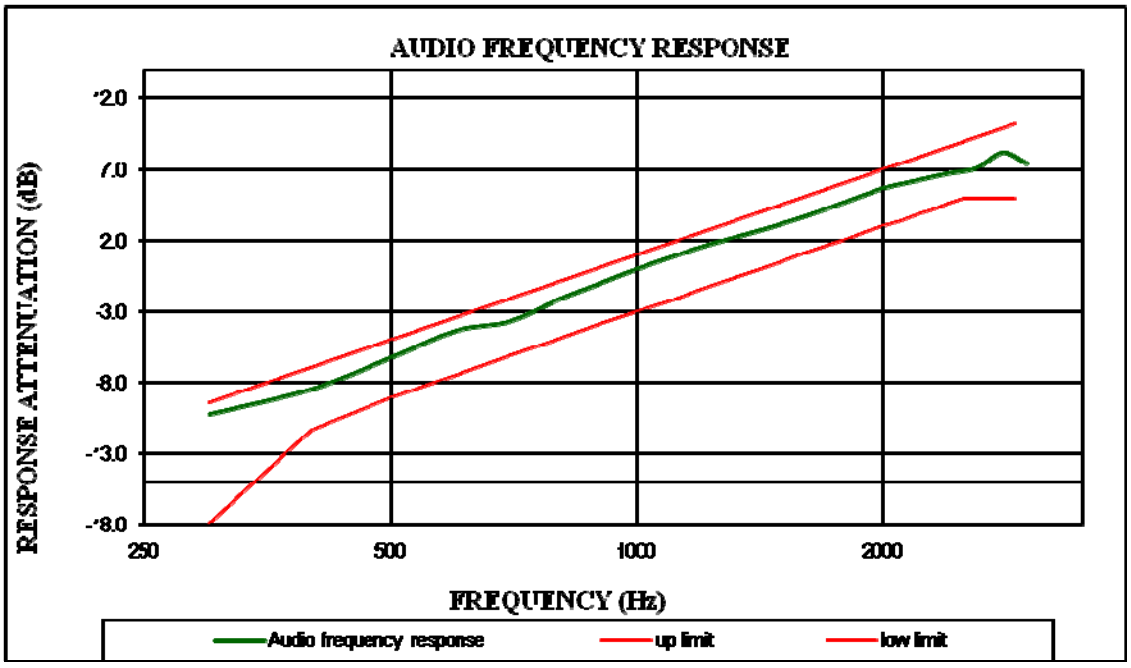
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	1.748	0.189	1.787	0.147	5
400	2.653	0.198	2.485	0.165	5
500	2.986	0.199	2.952	0.169	5
600	3.556	0.265	3.344	0.188	5
700	3.68	0.267	3.25	0.206	5
800	3.748	0.271	3.54	0.237	5
900	3.999	0.275	3.87	0.258	5
1000	4.095	0.316	4.15	0.259	5
1200	4.298	0.336	4.09	0.36	5
1400	3.98	0.485	3.99	0.366	5
1600	3.78	0.463	3.74	0.416	5
1800	3.89	0.487	3.871	0.455	5
2000	3.75	0.545	3.726	0.483	5
2200	3.88	0.554	3.66	0.494	5
2400	3.79	0.526	3.638	0.557	5
2600	3.85	0.628	3.77	0.595	5
2800	3.89	0.668	3.736	0.687	5
3000	3.65	0.623	3.58	0.608	5



Audio Frequency Response

Carrier Frequency: 454.2125 MHz, Channel Spacing = 25 kHz

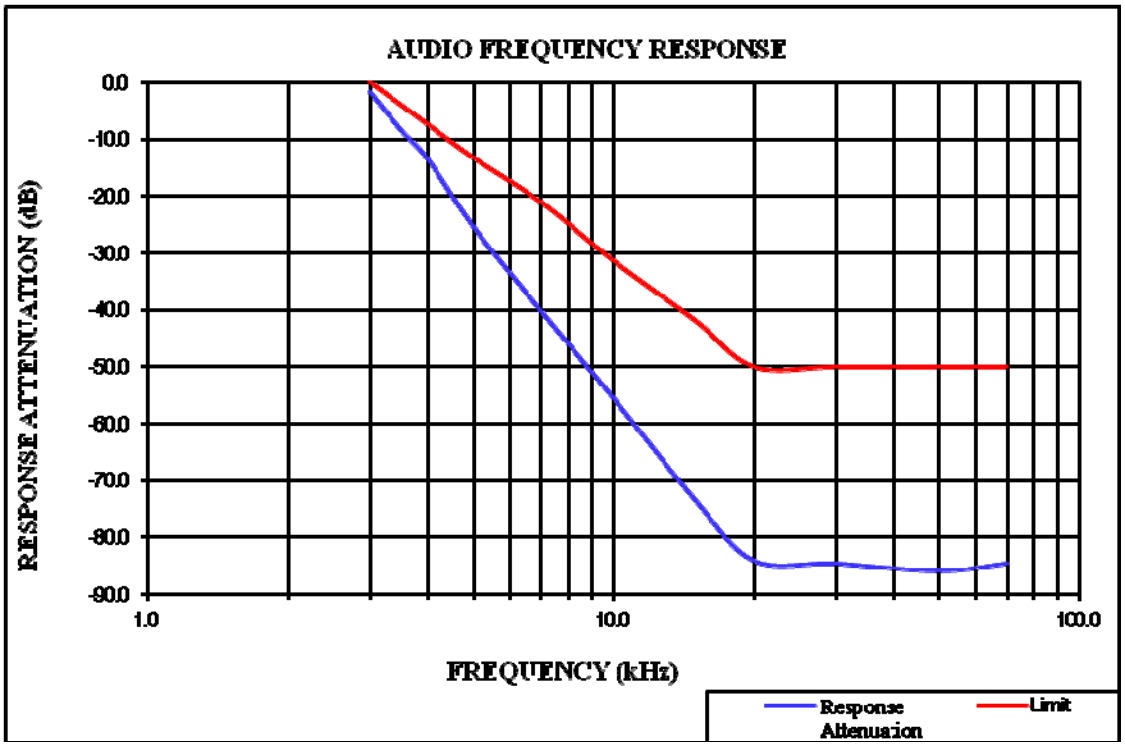
Audio Frequency	Response Attenuation
Hz	dB
300	-10.25
400	-8.47
500	-6.25
600	-4.36
700	-3.69
800	-2.17
900	-1.02
1000	0.00
1200	1.57
1400	2.66
1600	3.69
1800	4.74
2000	5.69
2200	6.25
2400	6.74
2600	7.09
2800	8.22
3000	7.44



Audio Frequency Low Pass Filter Response

Carrier Frequency: 454.2125 MHz, Channel Spacing = 25 kHz, high power level

Audio Frequency	Response Attenuation	Limit
kHz	dB	dB
3.0	-1.8	0.0
3.5	-8.5	-4.0
4.0	-13.7	-7.5
5.0	-25.5	-13.3
7.0	-40.4	-21.1
10.0	-55.7	-31.4
15.0	-73.6	-41.9
20.0	-84.2	-50.0
30.0	-84.7	-50.0
50.0	-86.0	-50.0
70.0	-84.7	-50.0

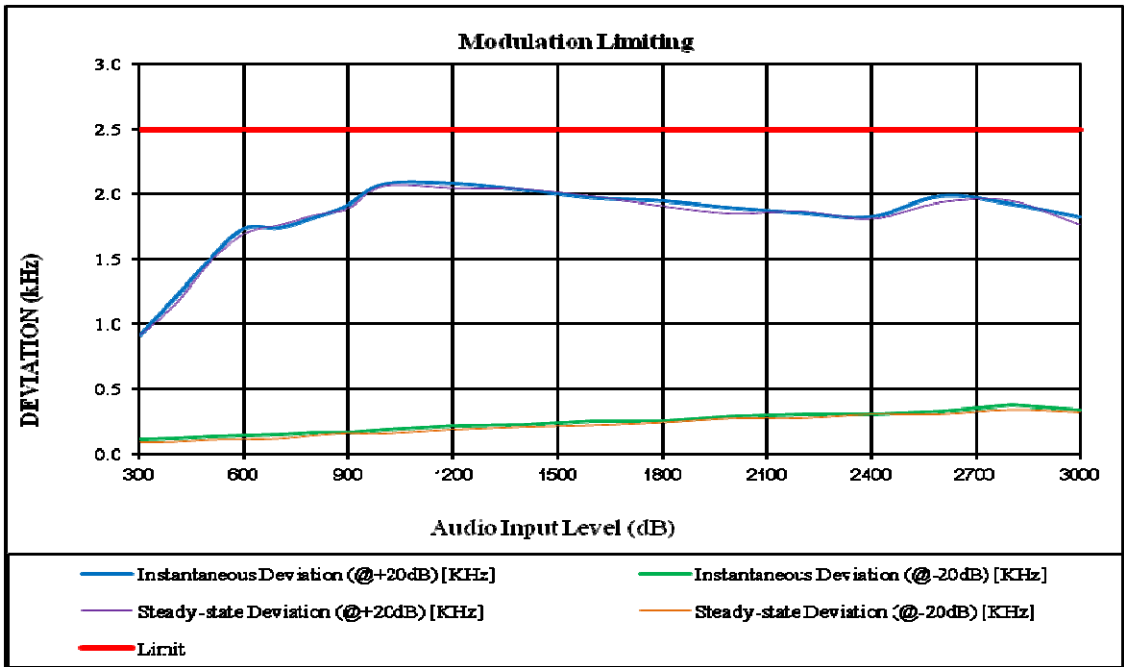


Part 74,FM, 12.5 kHz:

MODULATION LIMITING

Carrier Frequency: 455.0125 MHz, Channel Spacing = 12.5 kHz

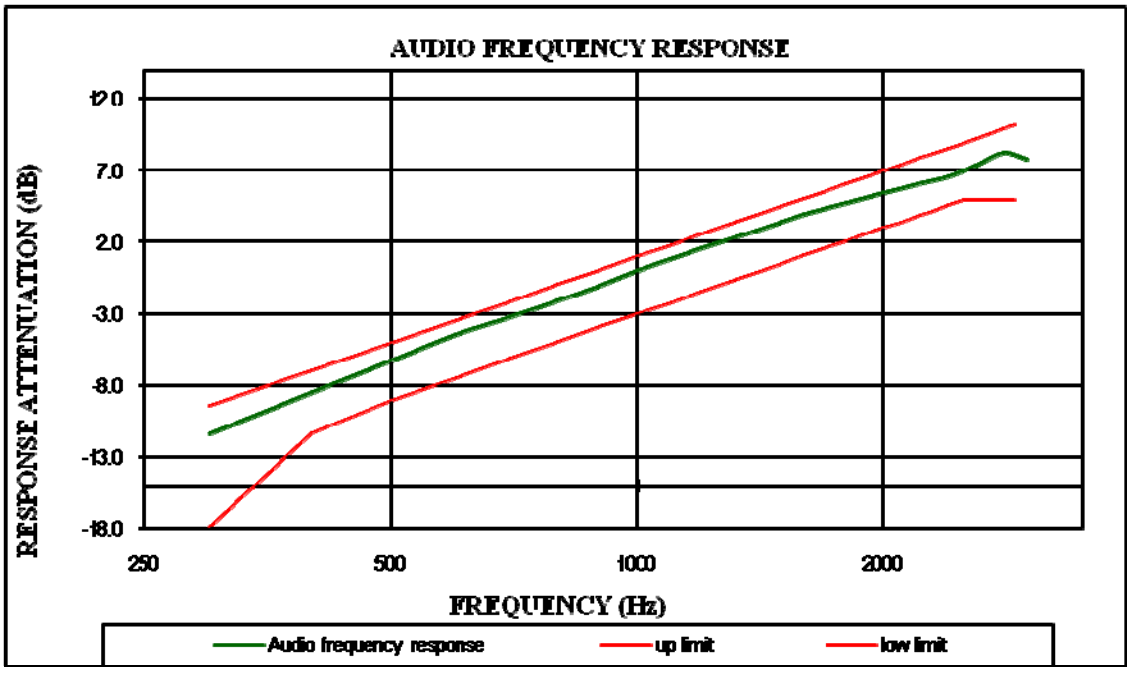
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	0.917	0.11	0.914	0.091	2.5
400	1.199	0.119	1.145	0.095	2.5
500	1.496	0.133	1.475	0.111	2.5
600	1.736	0.143	1.695	0.113	2.5
700	1.741	0.151	1.761	0.119	2.5
800	1.82	0.162	1.839	0.145	2.5
900	1.919	0.162	1.893	0.161	2.5
1000	2.076	0.186	2.063	0.159	2.5
1200	2.082	0.216	2.047	0.189	2.5
1400	2.032	0.228	2.038	0.21	2.5
1600	1.971	0.256	1.982	0.223	2.5
1800	1.947	0.258	1.91	0.244	2.5
2000	1.896	0.296	1.853	0.277	2.5
2200	1.858	0.306	1.87	0.279	2.5
2400	1.828	0.311	1.812	0.308	2.5
2600	1.985	0.331	1.938	0.309	2.5
2800	1.925	0.375	1.948	0.342	2.5
3000	1.825	0.34	1.765	0.323	2.5



Audio Frequency Response

Carrier Frequency: 455.0125 MHz, Channel Spacing = 12.5 kHz

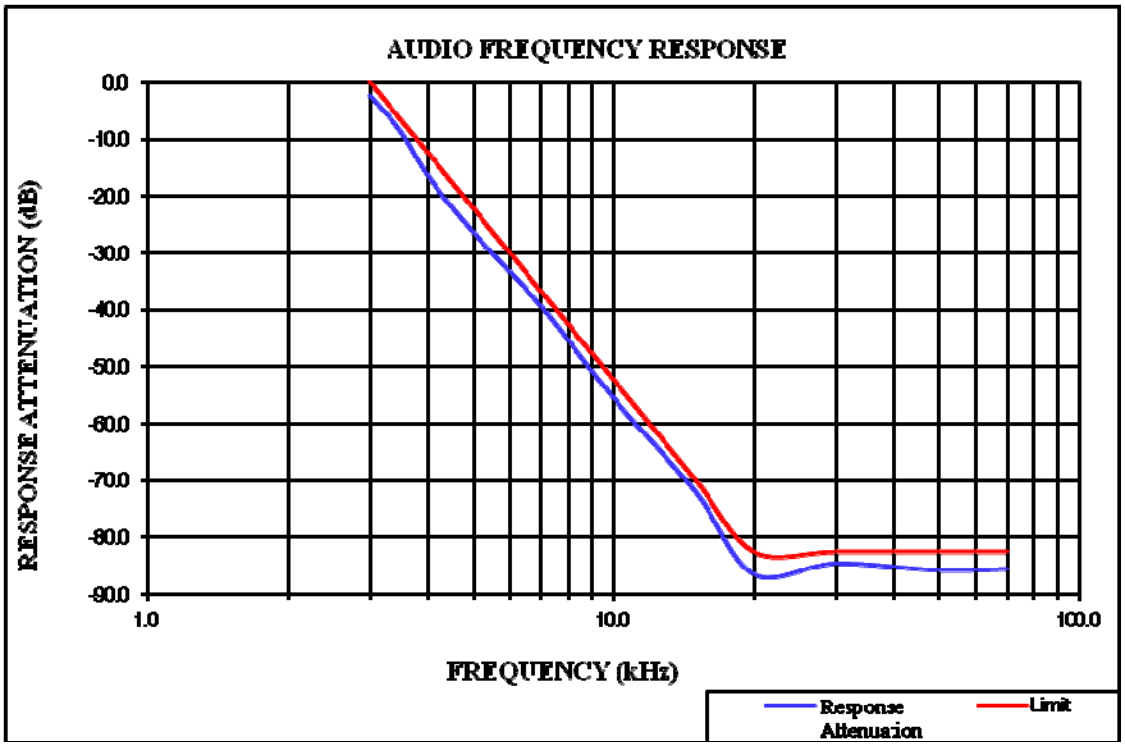
Audio Frequency	Response Attenuation
Hz	dB
300	-11.35
400	-8.48
500	-6.28
600	-4.48
700	-3.19
800	-2.11
900	-1.03
1000	0.00
1200	1.59
1400	2.85
1600	3.91
1800	4.78
2000	5.42
2200	6.05
2400	6.59
2600	7.40
2800	8.27
3000	7.80



Audio Frequency Low Pass Filter Response

Carrier Frequency: 455.0125 MHz, Channel Spacing = 12.5 kHz, high power level

Audio Frequency	Response Attenuation	Limit
kHz	dB	dB
3.0	-2.3	0.0
3.5	-8.7	-6.7
4.0	-16.5	-12.5
5.0	-26.4	-22.2
7.0	-39.4	-36.8
10.0	-55.6	-52.3
15.0	-72.1	-69.9
20.0	-86.6	-82.5
30.0	-84.7	-82.5
50.0	-85.9	-82.5
70.0	-85.7	-82.5

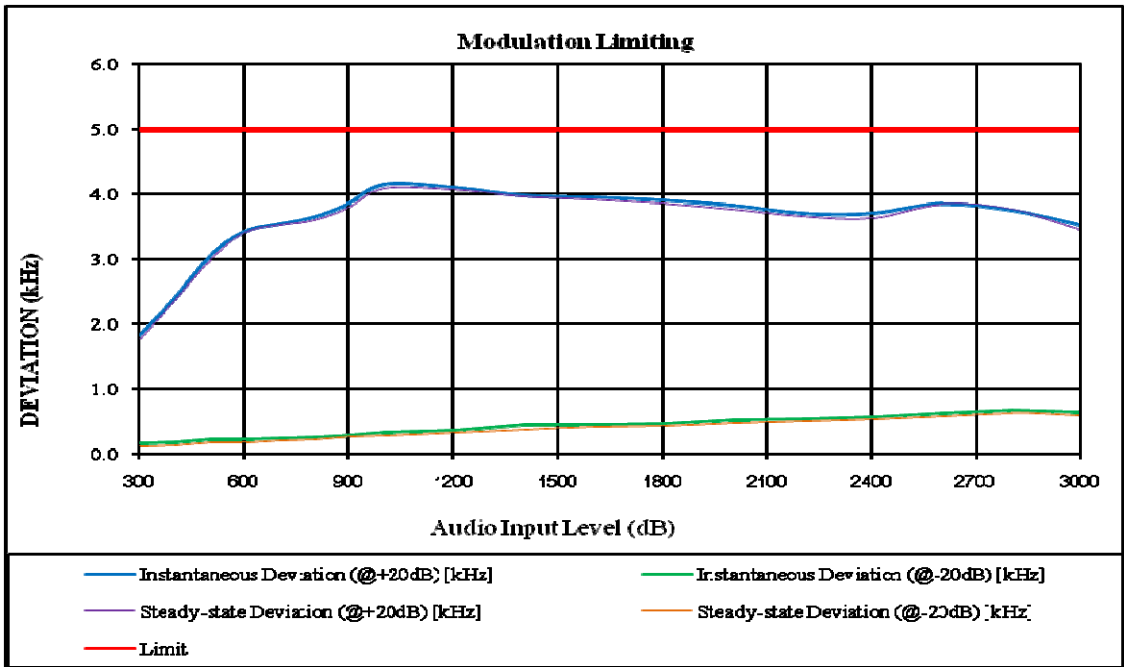


Part 74,FM, 25 kHz:

MODULATION LIMITING

Carrier Frequency: 455.6625 MHz, Channel Spacing = 25 kHz

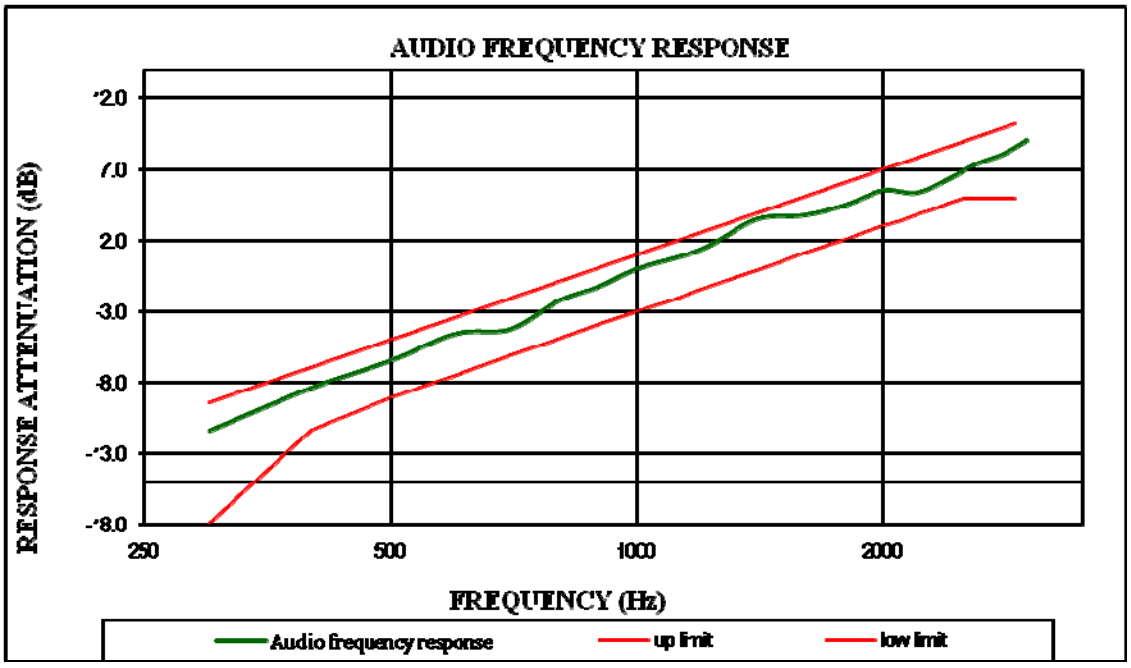
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	1.828	0.159	1.768	0.111	5
400	2.392	0.183	2.358	0.135	5
500	3.036	0.221	2.983	0.173	5
600	3.423	0.231	3.411	0.18	5
700	3.537	0.237	3.534	0.207	5
800	3.654	0.262	3.604	0.231	5
900	3.855	0.289	3.8	0.267	5
1000	4.15	0.329	4.085	0.288	5
1200	4.101	0.361	4.066	0.323	5
1400	3.974	0.445	3.97	0.381	5
1600	3.944	0.458	3.919	0.418	5
1800	3.912	0.471	3.853	0.44	5
2000	3.832	0.533	3.774	0.475	5
2200	3.707	0.549	3.658	0.51	5
2400	3.706	0.579	3.634	0.538	5
2600	3.858	0.632	3.849	0.583	5
2800	3.759	0.68	3.769	0.638	5
3000	3.52	0.65	3.447	0.607	5



Audio Frequency Response

Carrier Frequency: 455.6625 MHz, Channel Spacing = 25 kHz

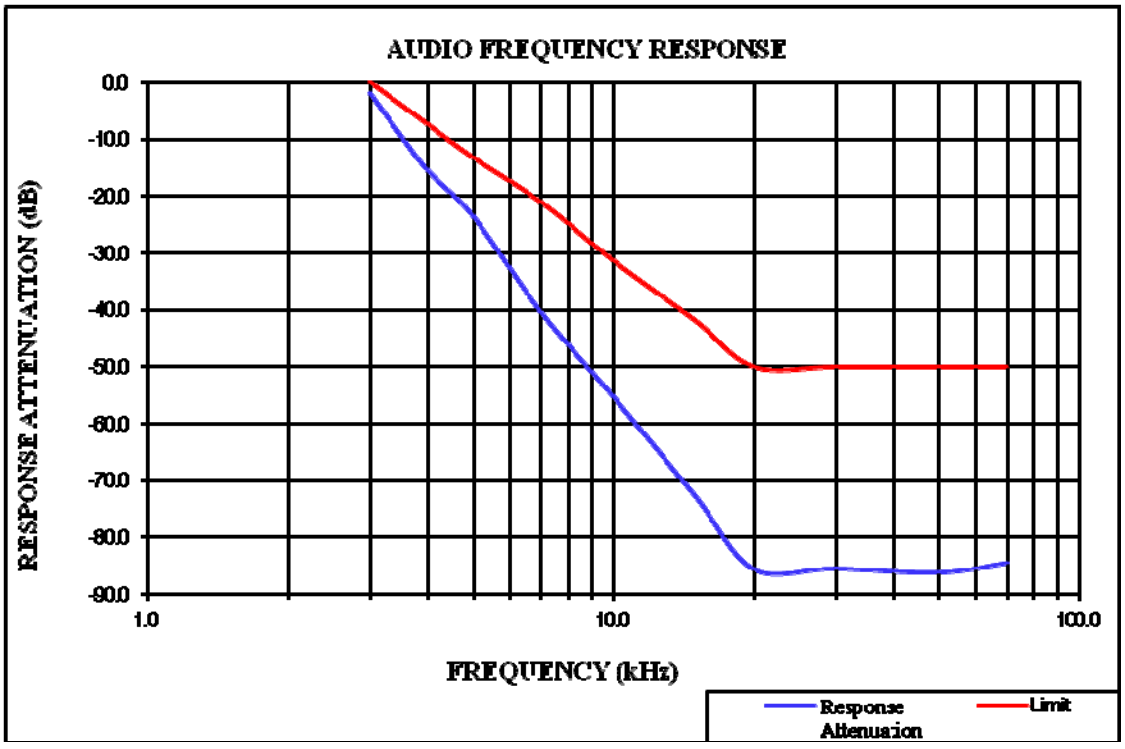
Audio Frequency	Response Attenuation
Hz	dB
300	-11.32
400	-8.32
500	-6.42
600	-4.54
700	-4.23
800	-2.26
900	-1.22
1000	0.00
1200	1.38
1400	3.48
1600	3.75
1800	4.47
2000	5.49
2200	5.32
2400	6.27
2600	7.34
2800	8.01
3000	8.99



Audio Frequency Low Pass Filter Response

Carrier Frequency: 455.6625 MHz, Channel Spacing = 25 kHz, high power level

Audio Frequency	Response Attenuation	Limit
kHz	dB	dB
3.0	-1.9	0.0
3.5	-9.4	-4.0
4.0	-15.6	-7.5
5.0	-23.6	-13.3
7.0	-40.5	-21.1
10.0	-55.4	-31.4
15.0	-72.9	-41.9
20.0	-85.7	-50.0
30.0	-85.6	-50.0
50.0	-86.3	-50.0
70.0	-84.6	-50.0



FCC §2.1049& §22.357 & § 22.731 &§90.209 & §90.210 & §74.462 – OCCUPIED BANDWIDTH & EMISSION MASK

Applicable Standard

FCC §2.1049, §22.357, § 22.731, §90.209 and §90.210 , §74.462

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 f0 to 5.625 kHz removed from f0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd−2.88 kHz) dB.

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

Emission Mask B - 25 kHz channel bandwidth equipment. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated 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.

Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 30 kHz or more. In the 60 kHz bands immediately outside and adjacent to the authorized frequency range or channel, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 30 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
R&S	Spectrum Analyzer	FSEM	831259/019	2017-07-18	2018-7-18
HP	RF Communications Test Set	8920A	00 235	2017-07-11	2018-07-11
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	Each Time	/
E-Microwave	RF Attenuator	20dB	20dB-2	Each Time	/
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100 Hz or 300 Hz and the spectrum was recorded in the frequency band ±50 kHz from the carrier frequency.

Test Data

Environmental Conditions

Temperature:	25.4 °C~25.5 °C
Relative Humidity:	51 %~52 %
ATM Pressure:	100.1 kPa~100.2 kPa

The testing was performed by Pean Zhu on 2017-09-24 and 2017-11-27.

Test Result: Compliant. Please refer to the following tables and plots.

FCC Part 90:

Modulation Mode	Channel Spacing	f_c	99% Occupied Bandwidth	26 dB Bandwidth	Power Level
		MHz	kHz	kHz	
FM	12.5 kHz	453.2125	9.90	10.30	High
			9.90	10.30	Low
4FSK	12.5 kHz		7.40	9.40	High
			7.40	9.70	Low

FCC Part 22:

Modulation Mode	Channel Spacing	f_c	99% Occupied Bandwidth	26 dB Bandwidth	Power Level
		MHz	kHz	kHz	
FM	12.5 kHz	454.0125	9.90	10.30	High
			9.90	10.30	Low
4FSK			7.40	9.80	High
			7.30	9.80	Low
FM	25 kHz	454.2125	14.78	15.78	High
			14.78	15.78	Low

FCC Part 74:

Modulation Mode	Channel Spacing	f_c	99% Occupied Bandwidth	26 dB Bandwidth	Power Level
		MHz	kHz	kHz	
FM	12.5 kHz	455.0125	9.90	10.30	High
			9.90	10.30	Low
	25 kHz	455.6625	15.25	16.50	High
			15.50	16.25	Low
4FSK	12.5 kHz	455.0125	7.60	10.00	High
			7.40	9.70	Low

Note: Emission bandwidth was based on calculation method instead of measurement.

Emission Designator

Per CFR 47 §2.201& §2.202, BW = 2M + 2D

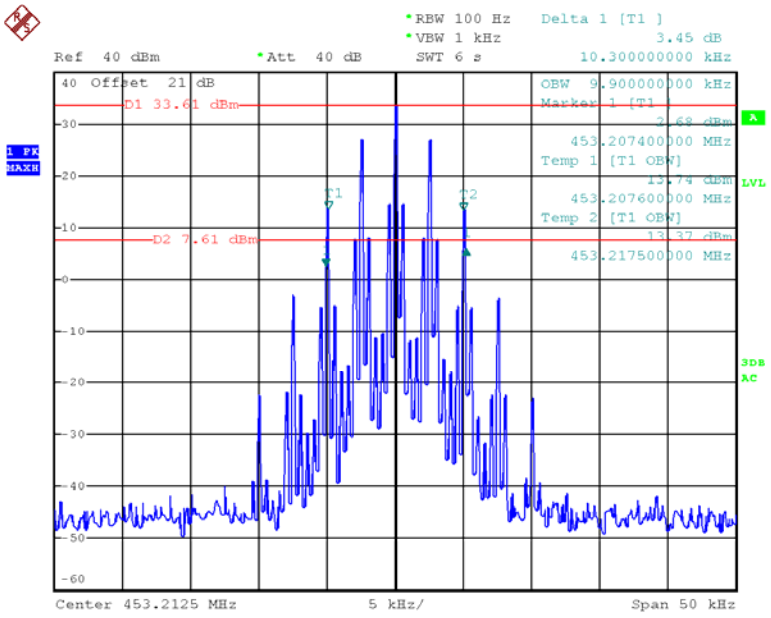
For FM Mode (Channel Spacing: 12.5 kHz)
Emission Designator 11K0F3E
In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz = 11K0
F3E portion of the designator represents an FM voice transmission
Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

For FM Mode (Channel Spacing: 25 kHz)
Emission Designator 16K0F3E
In this case, the maximum modulating frequency is 3.0 kHz with a 5.0 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 5.0 kHz) = 16 kHz =16K0
F3E portion of the designator represents an FM voice transmission
Therefore, the entire designator for 25 kHz channel spacing FM mode is 16K0F3E.

For Digital Mode (Channel Spacing: 12.5 kHz)
Emission Designator 7K60F1D and 7K60F1E
The 99% energy rule (title 47CFR 2.1049) was used for digital mode. It basically states that 99% of the modulation energy falls within X kHz, in this case, 7.60 kHz. The emission mask was obtained from 47CFR 90.210(d).
F1D and F1E portion of the designator indicates digital information.
Therefore, the entire designator for 12.5 kHz channel spacing digital mode is 7K60F1D and 7K60F1E.

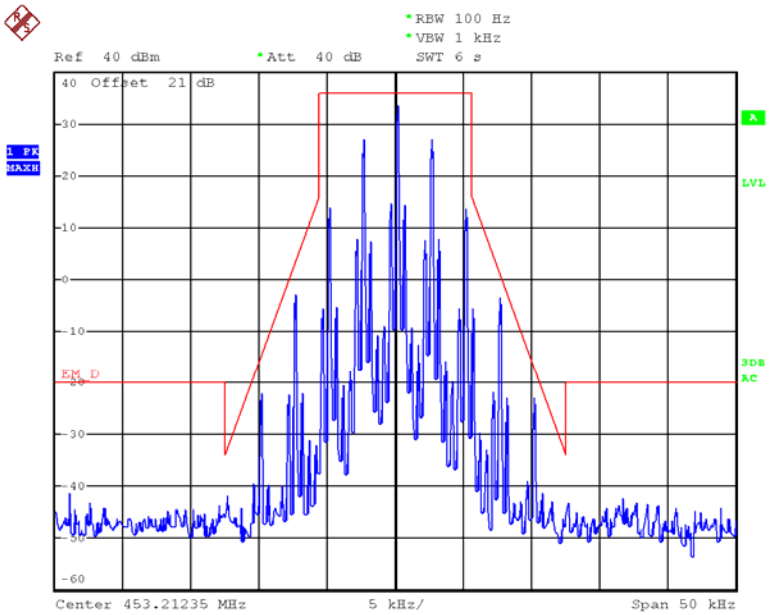
Part 90:

Occupied Bandwidth – FM, 453.2125 MHz, High Power Level



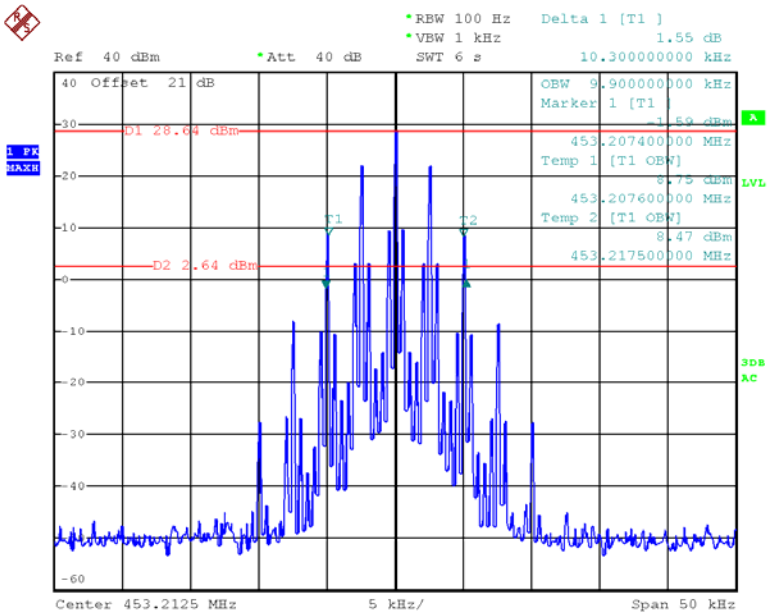
Date: 24.SEP.2017 18:43:31

Emission Mask - Type D



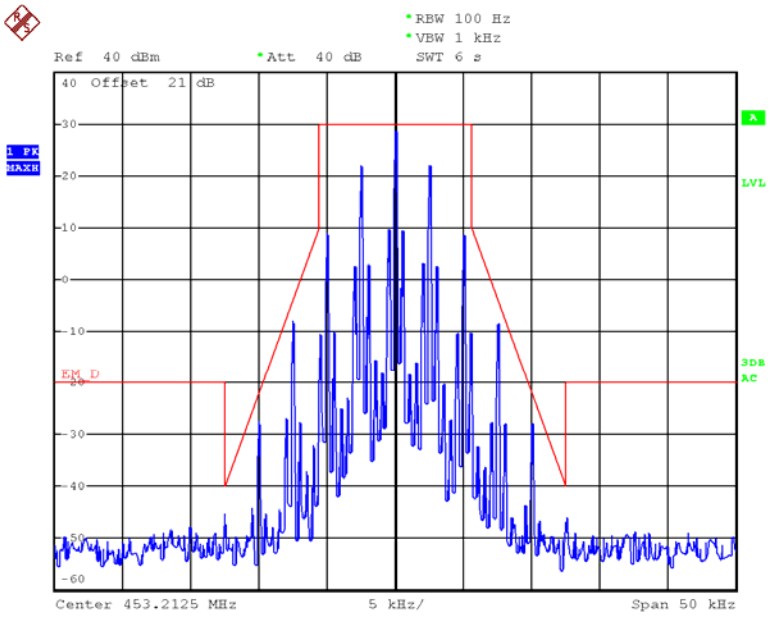
Date: 24.SEP.2017 18:37:40

Occupied Bandwidth – FM, 453.2125 MHz, Low Power Level



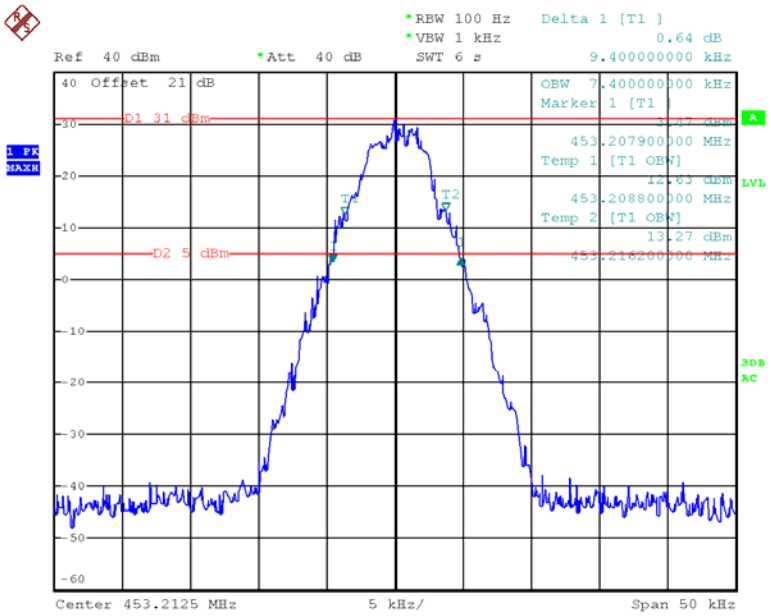
Date: 24.SEP.2017 19:03:03

Emission Mask - Type D



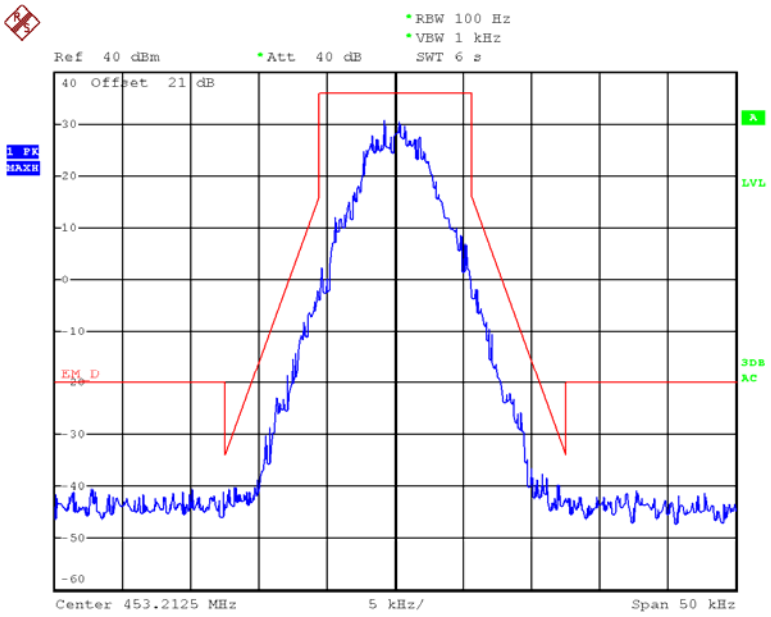
Date: 24.SEP.2017 18:53:20

Occupied Bandwidth – 4FSK, 453.2125 MHz, High Power Level



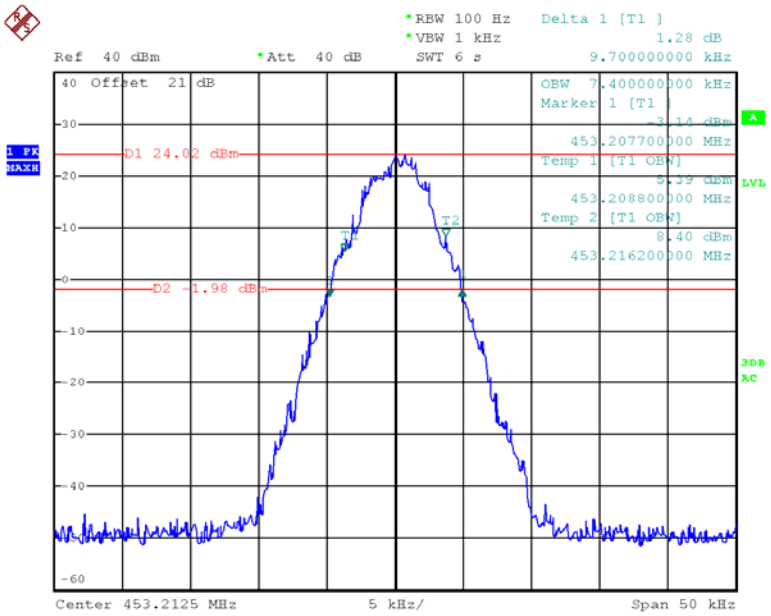
Date: 24.SEP.2017 18:04:56

Emission Mask - Type D



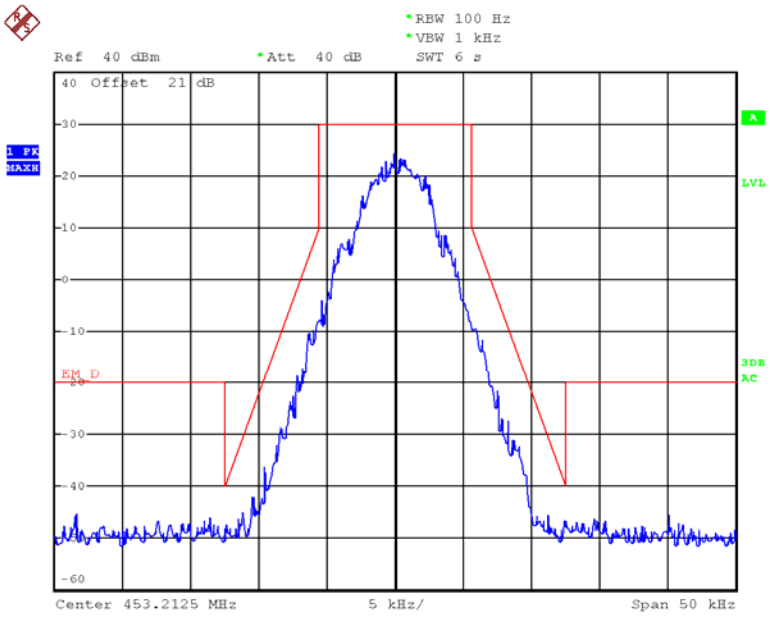
Date: 24.SEP.2017 17:54:56

Occupied Bandwidth – 4FSK, 453.2125 MHz, Low Power Level



Date: 24.SEP.2017 17:20:14

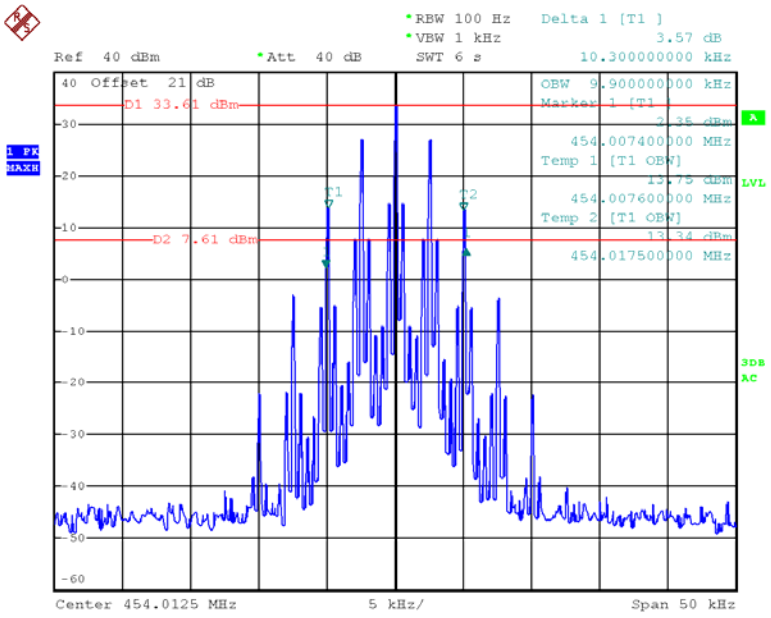
Emission Mask - Type D



Date: 24.SEP.2017 17:00:08

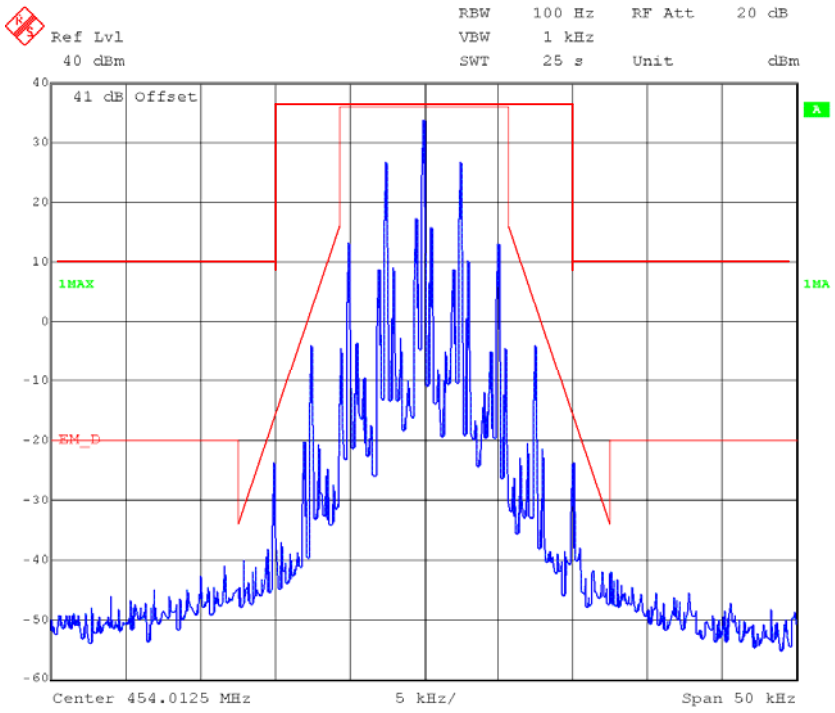
Part 22.359:

Occupied Bandwidth – FM, 12.5kHz, 454.0125 MHz, High Power Level



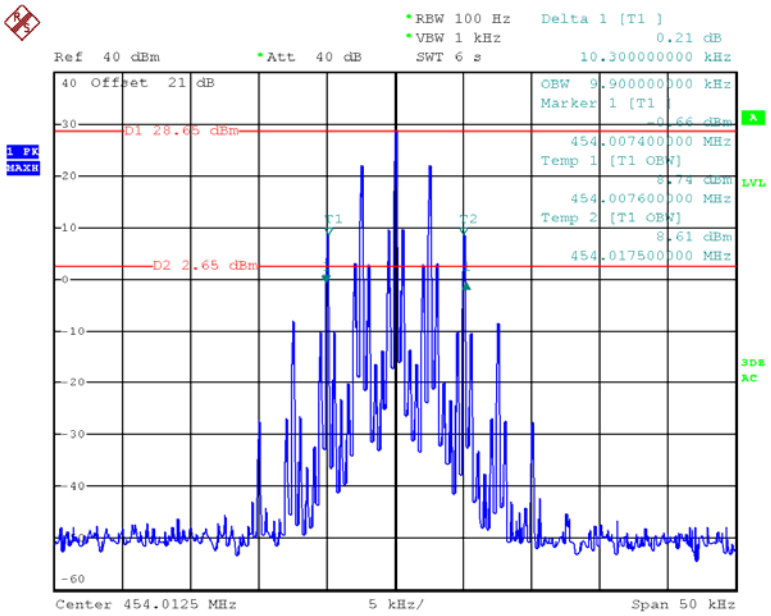
Date: 24.SEP.2017 18:44:57

Emission Mask ,FCC part 22.359



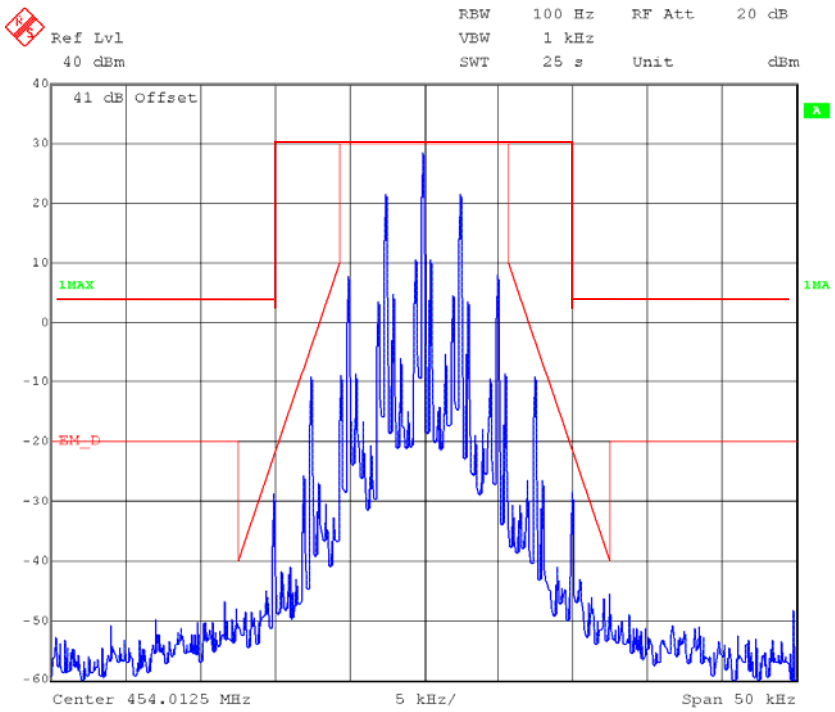
Date: 24.AUG.2017 22:40:19

Occupied Bandwidth – FM, 12.5kHz, 454.0125 MHz, Low Power Level



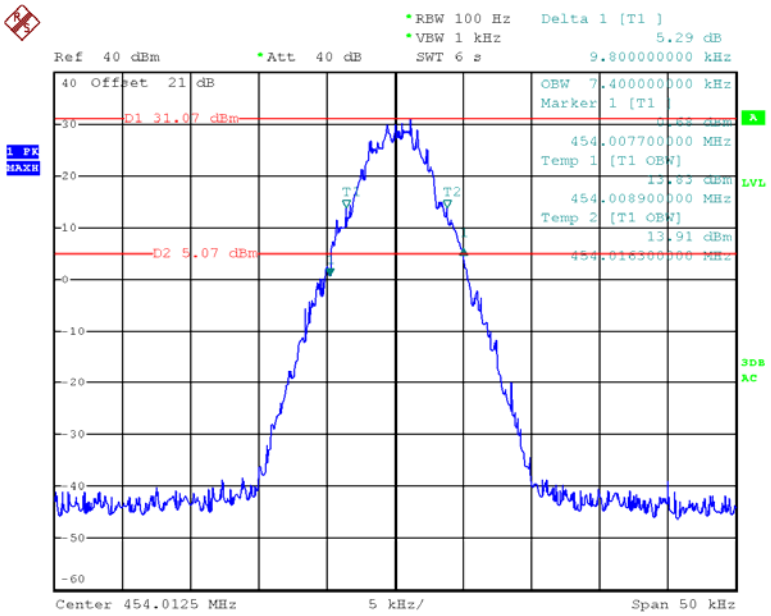
Date: 24.SEP.2017 19:04:56

Emission Mask - Type D

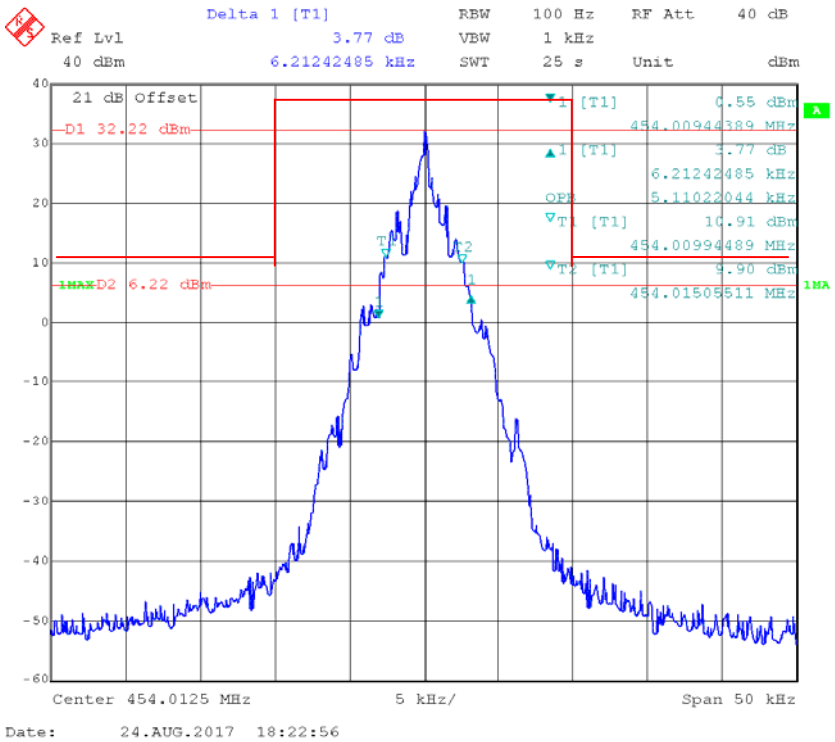


Date: 24.AUG.2017 23:30:13

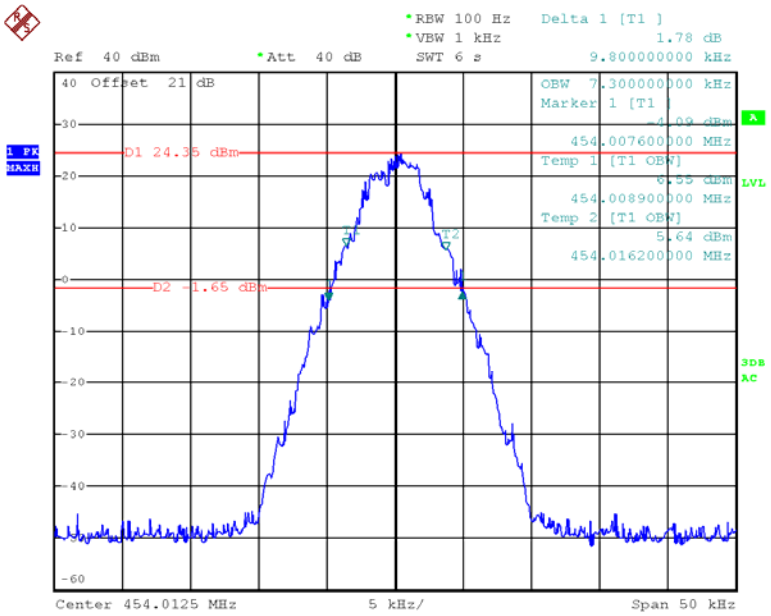
Occupied Bandwidth – 4FSK,12.5kHz, 454.0125 MHz, High Power Level



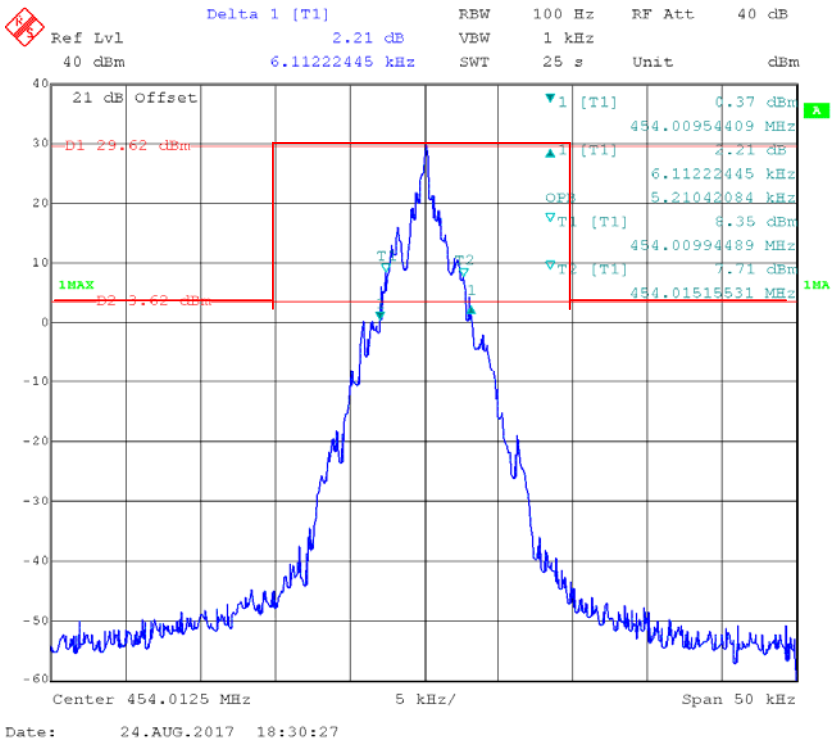
Emission Mask ,FCC part 22.359



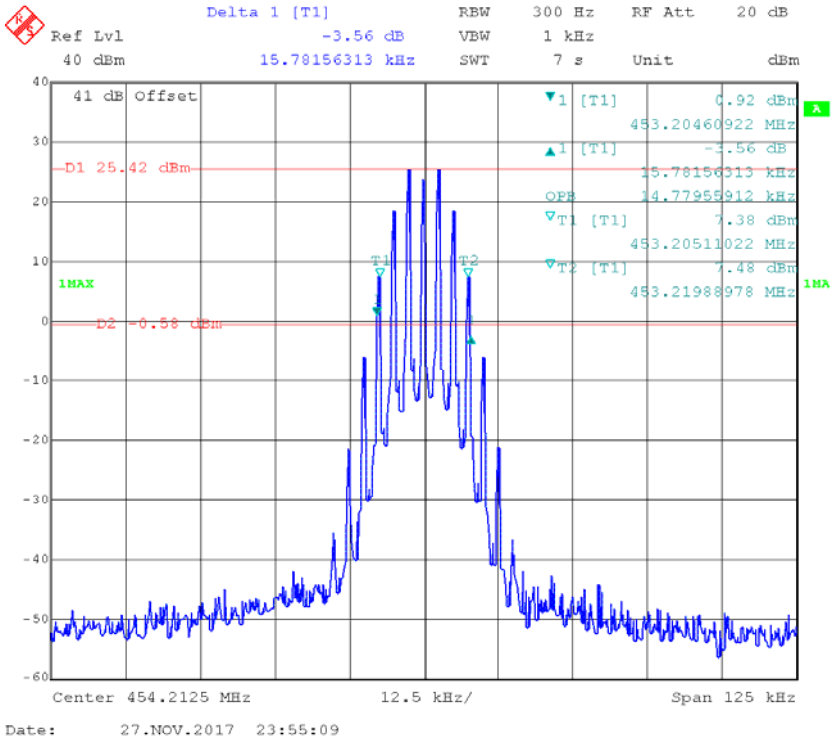
Occupied Bandwidth – 4FSK,12.5kHz, 454.0125 MHz, Low Power Level



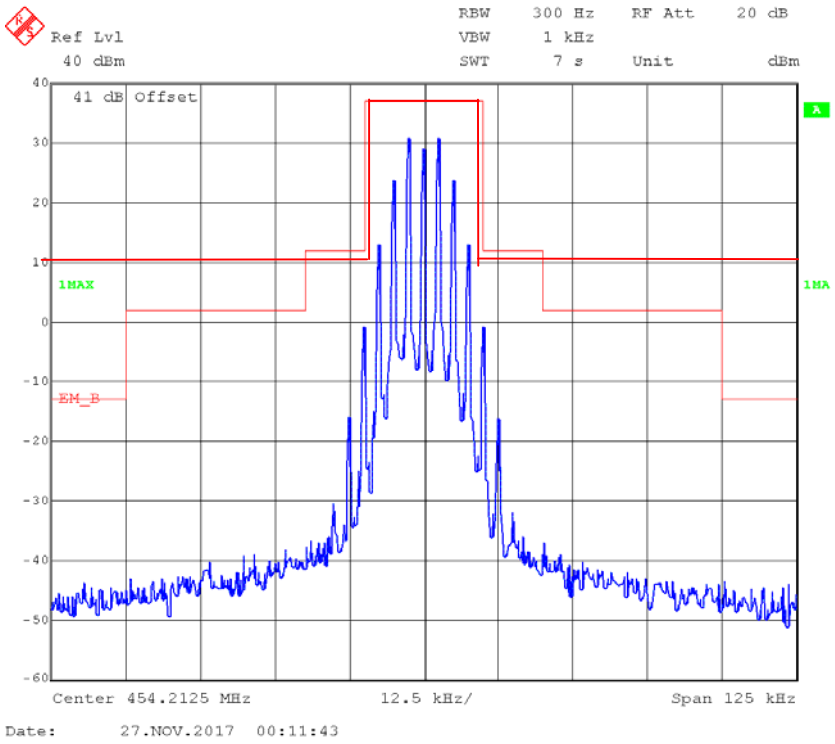
Emission Mask ,FCC part 22.359



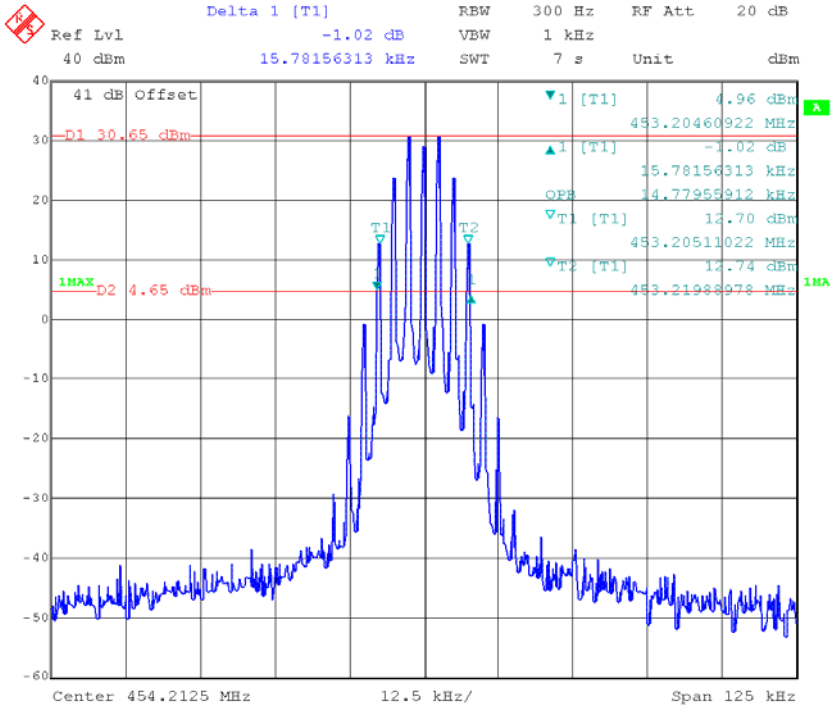
Occupied Bandwidth – FM, 25kHz, 454.2125 MHz, High Power Level



Emission Mask ,FCC part 22.359

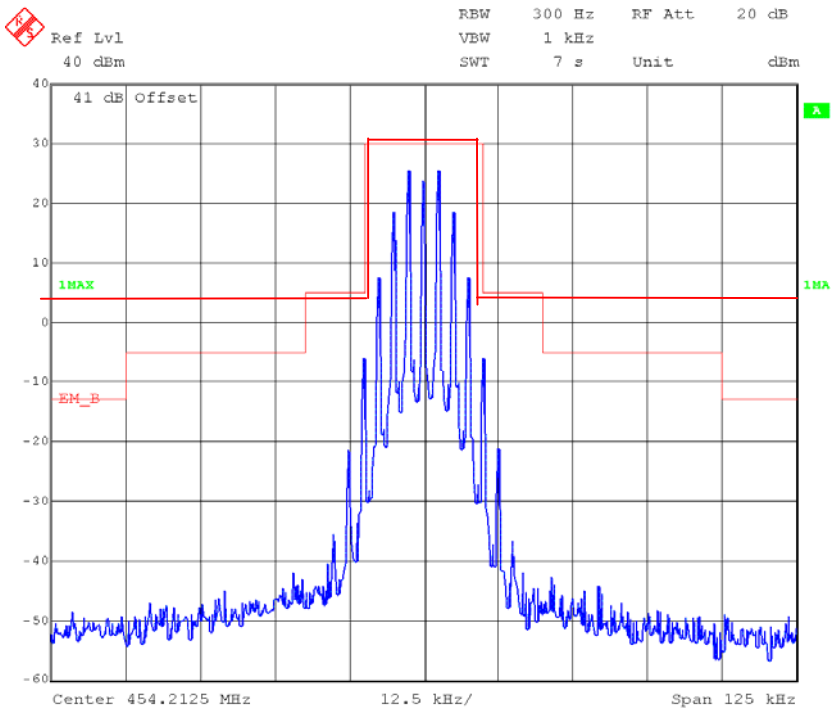


Occupied Bandwidth – FM, 25kHz, 454.2125 MHz, Low Power Level



Date: 27.NOV.2017 00:13:07

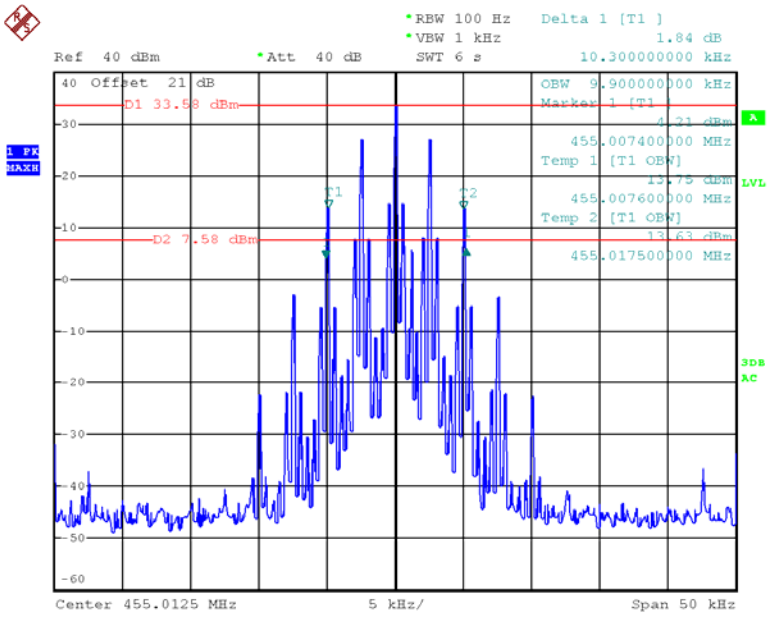
Emission Mask ,FCC part 22.359



Date: 27.NOV.2017 23:54:11

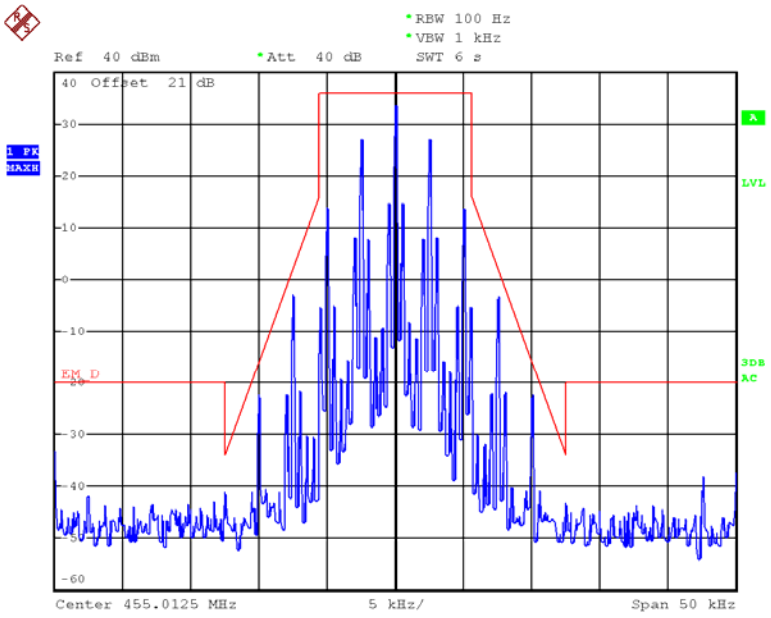
Part 74.462:

Bandwidth – FM, 455.0125 MHz, High Power Level



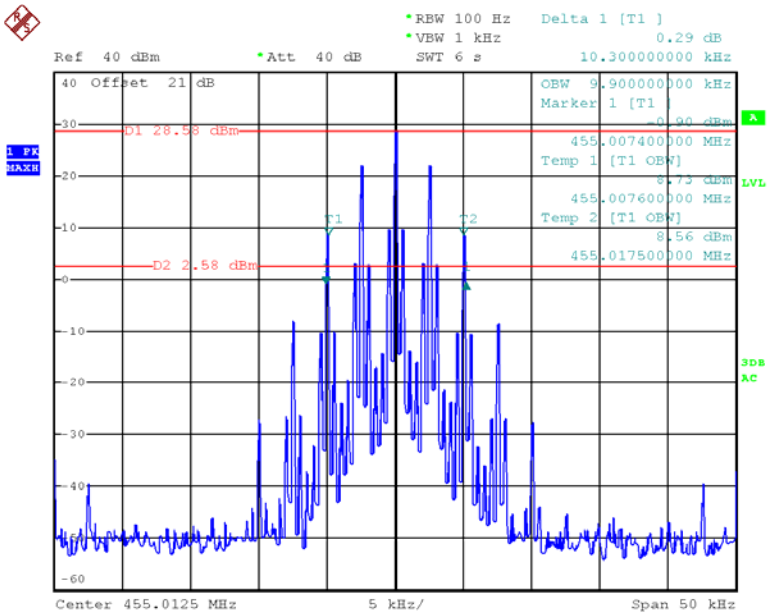
Date: 24.SEP.2017 18:41:53

Emission Mask - Type D



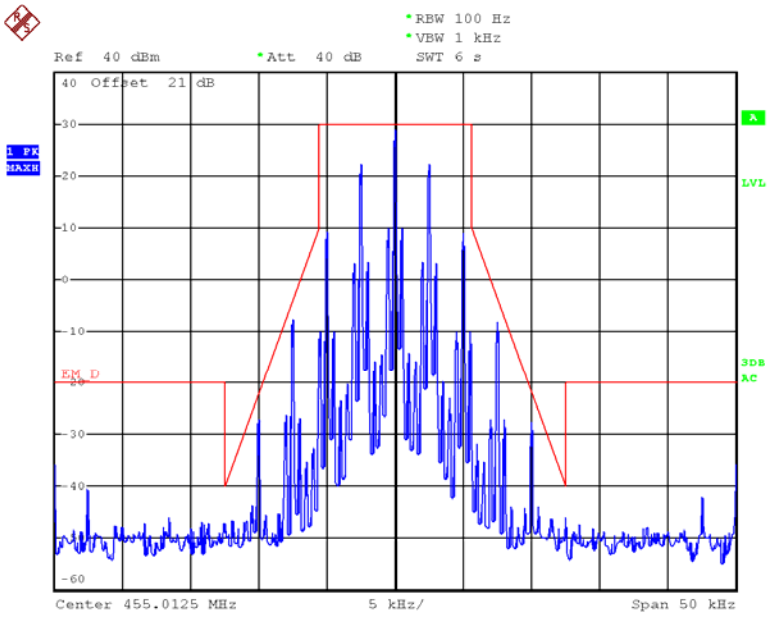
Date: 24.SEP.2017 18:37:05

Bandwidth – FM, 455.0125 MHz, Low Power Level



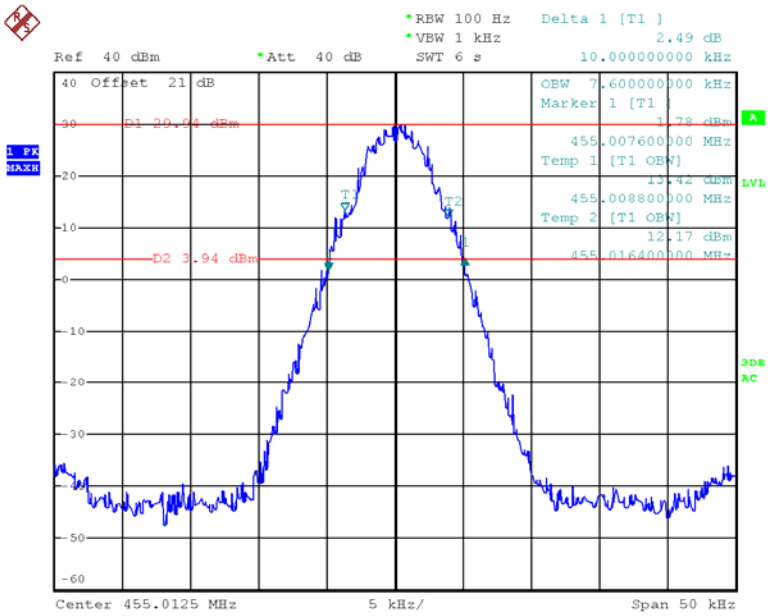
Date: 24.SEP.2017 19:01:32

Emission Mask - Type D



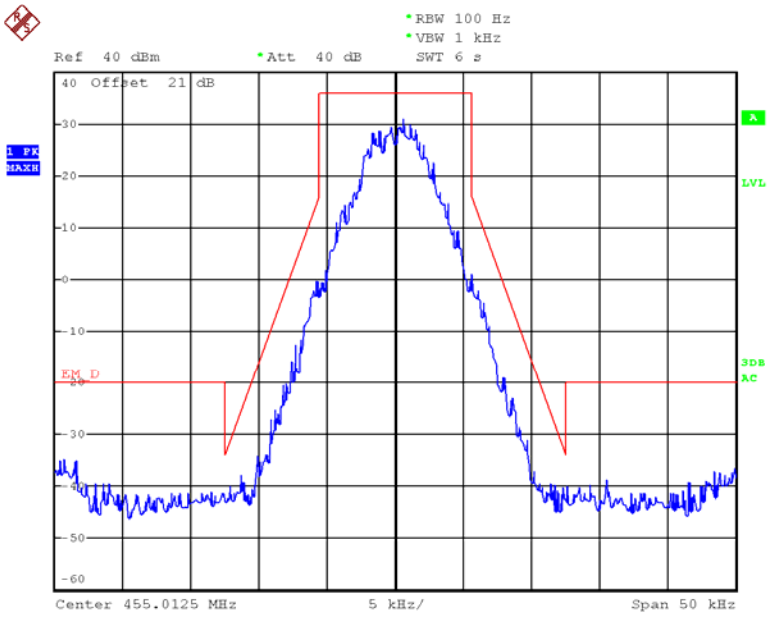
Date: 24.SEP.2017 20:40:16

Bandwidth – 4FSK, 455.0125 MHz, High Power Level



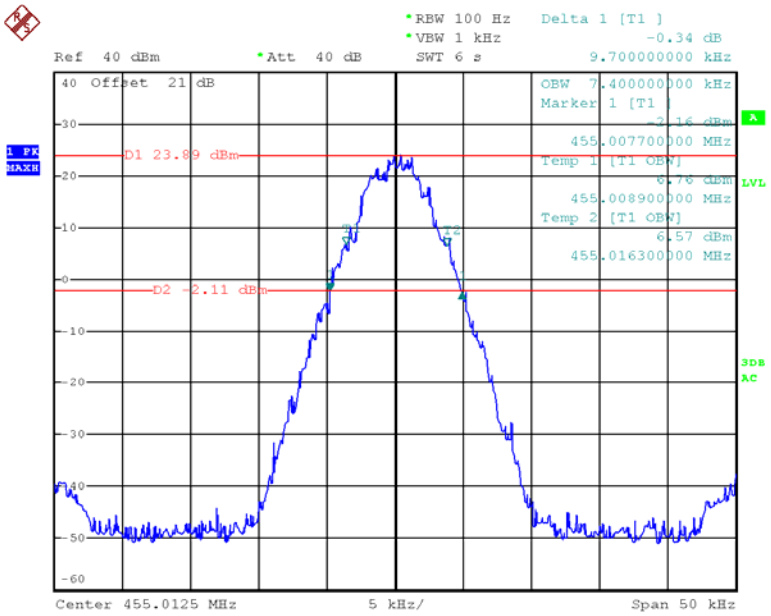
Date: 24.SEP.2017 18:02:46

Emission Mask - Type D



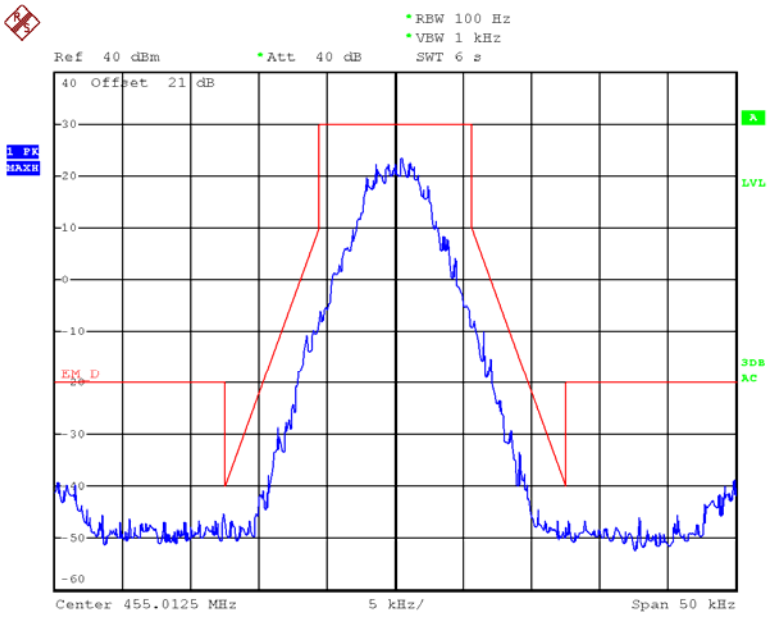
Date: 24.SEP.2017 17:52:42

Bandwidth – 4FSK, 455.0125 MHz, Low Power Level



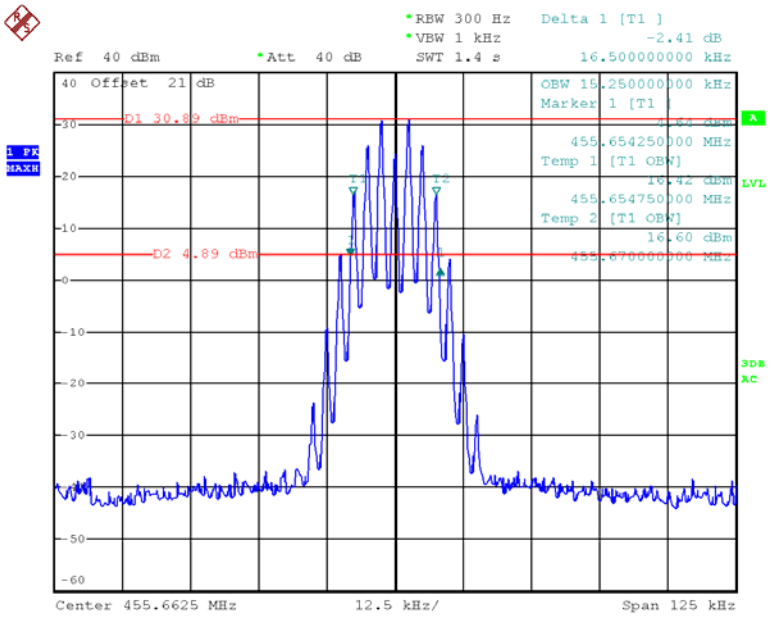
Date: 24.SEP.2017 17:44:44

Emission Mask - Type D



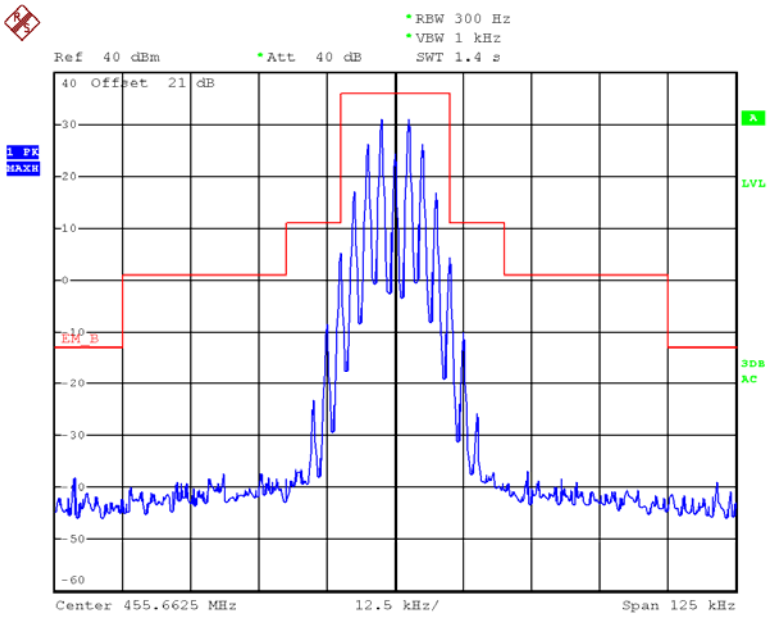
Date: 24.SEP.2017 17:47:52

Bandwidth – FM, 25kHz, 455.6625 MHz, High Power Level



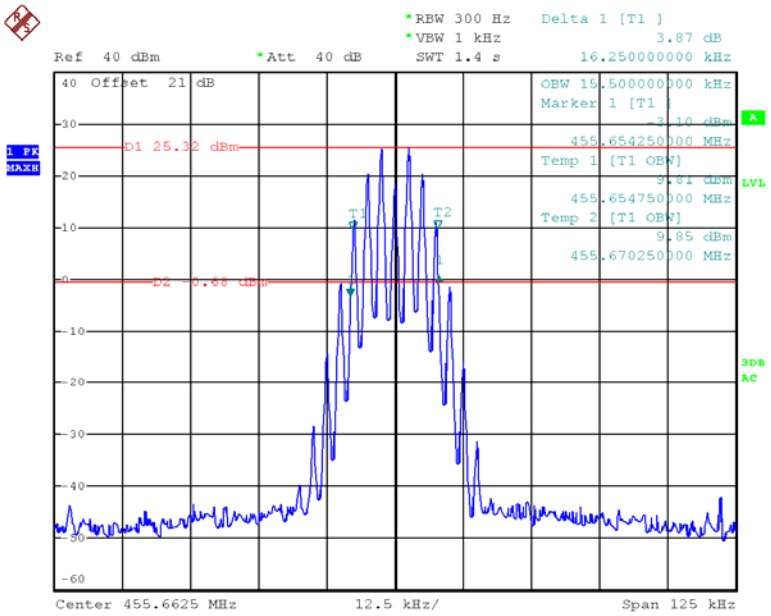
Date: 24.SEP.2017 21:45:16

Emission Mask - Type B



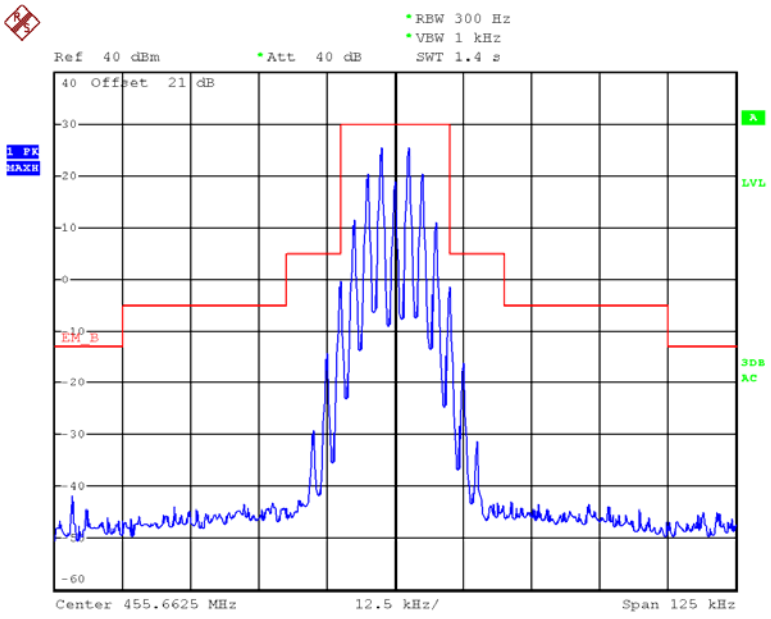
Date: 24.SEP.2017 19:59:35

Bandwidth – FM, 25kHz, 455.6625 MHz, Low Power Level



Date: 24.SEP.2017 19:53:19

Emission Mask - Type B



Date: 24.SEP.2017 19:40:24

FCC §2.1051& §22.861 & §90.210& §74.462 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

§90.210 Emission limitations:

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 f0 to 5.625 kHz removed from f0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd−2.88 kHz) dB.

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

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two or three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emission mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth, see paragraph (o) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, an alternate procedure may be used provided prior Commission approval is obtained.

§22.861 Emission limitations:

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

§74.462 Emission limitations:

(c) For emissions on frequencies above 25 MHz with authorized bandwidths up to 30 kHz, the emissions shall comply with the emission mask and transient frequency behavior requirements of §§90.210 and 90.214 of this chapter. For all other emissions, the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) On any frequency removed from the assignment frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB:

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

(3) On any frequency removed from the assigned frequency by more than 250 percent on the authorized bandwidth; at least 43 plus 10 $\log^{10}$ (mean output power, in watts) dB.

(d) In the event a station's emissions outside its authorized channel cause harmful interference, the Commission may, at its discretion, require the licensee to take such further steps as may be necessary to eliminate the interference.

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	831259/019	2017-07-18	2018-7-18
HP	RF Communications Test Set	8920A	00 235	2017-07-11	2018-07-11
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2017-05-06	2018-05-06
E-Microwave	RF Attenuator	20dB	20dB-2	Each Time	/
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Adjust the spectrum analyzer for the following settings:
1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
2) Video Bandwidth ≥3 times the resolution bandwidth.
3) Sweep Speed ≤2000 Hz per second.
4) Detector Mode = peak.

Test Data

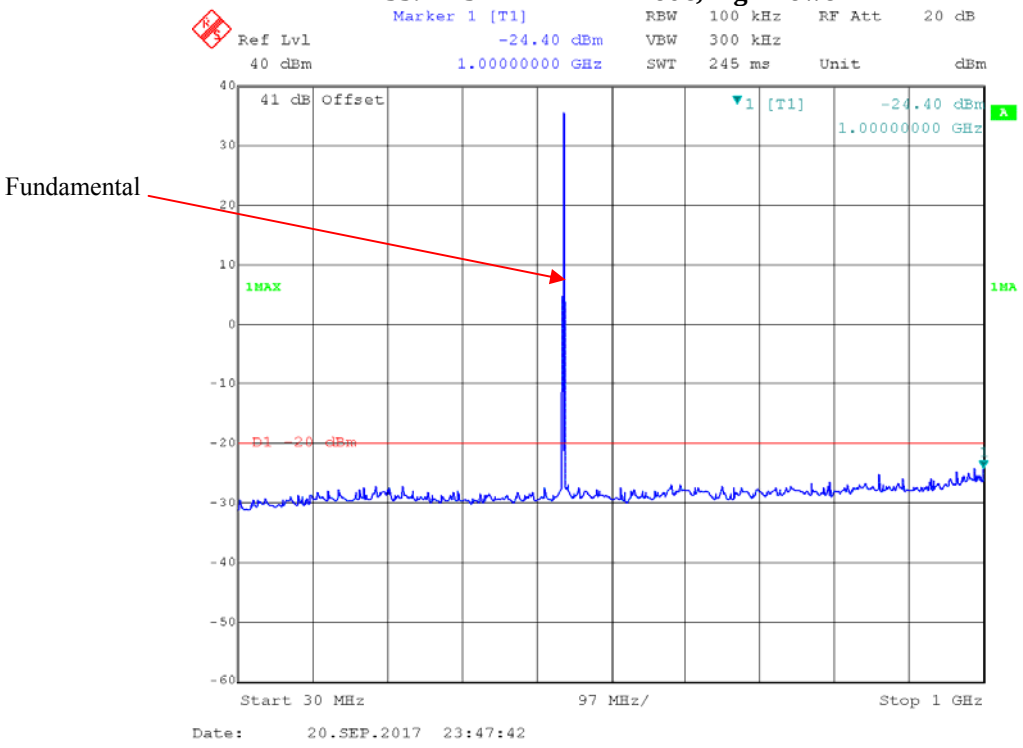
Environmental Conditions

Temperature:	25.4~25.6 °C
Relative Humidity:	53~57 %
ATM Pressure:	100.1~100.5 kPa

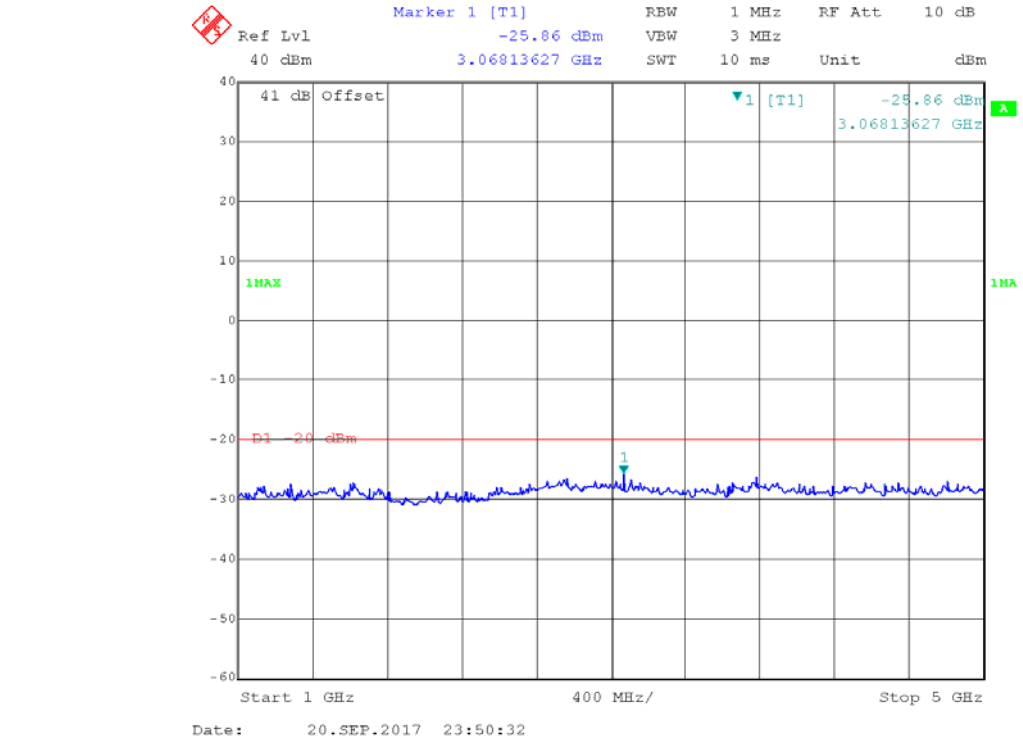
The testing was performed by Pean Zhu from 2017-09-20 to 2017-09-21.

FCC PART 90

453.2125 MHz – FM Mode,High Power

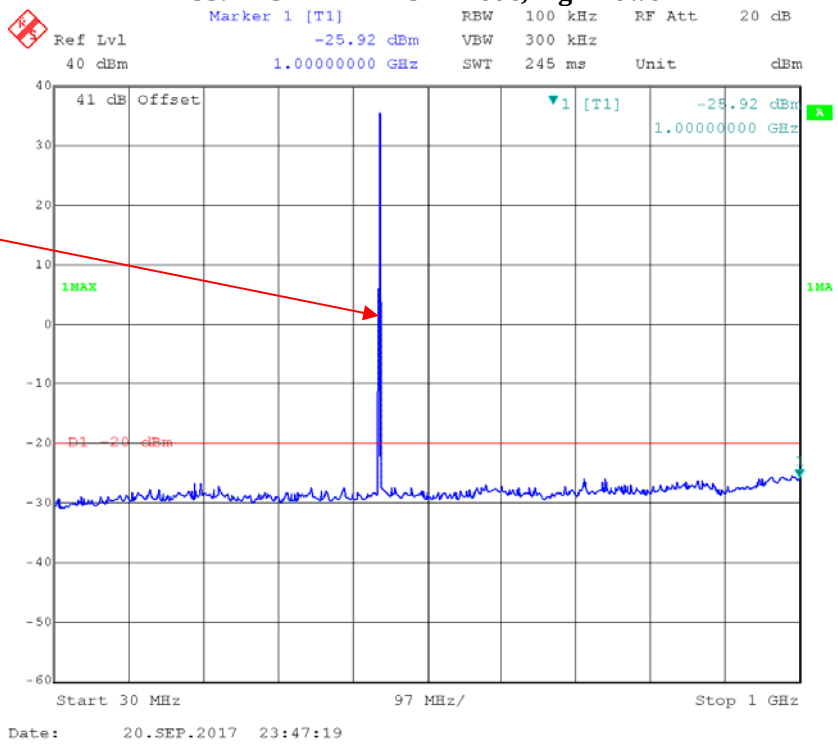


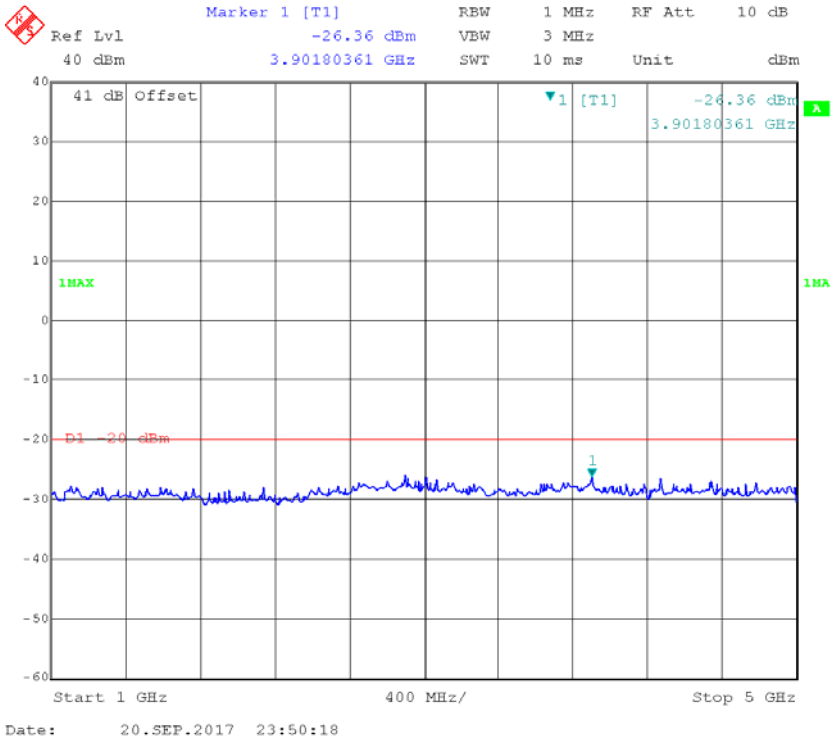
Fundamental



FCC PART 90
453.2125 MHz –4FSK Mode,High Power

Fundamental

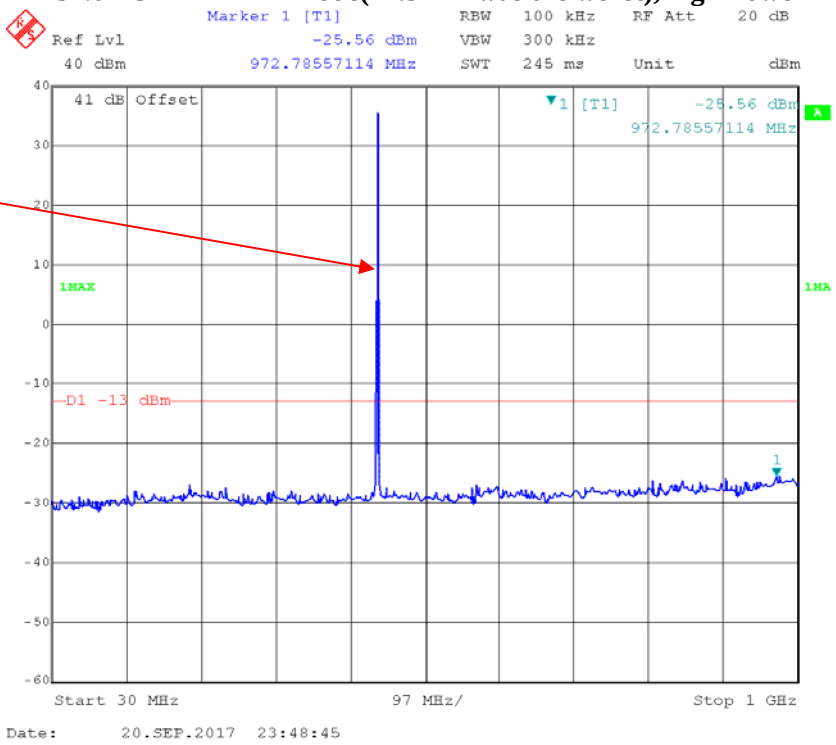


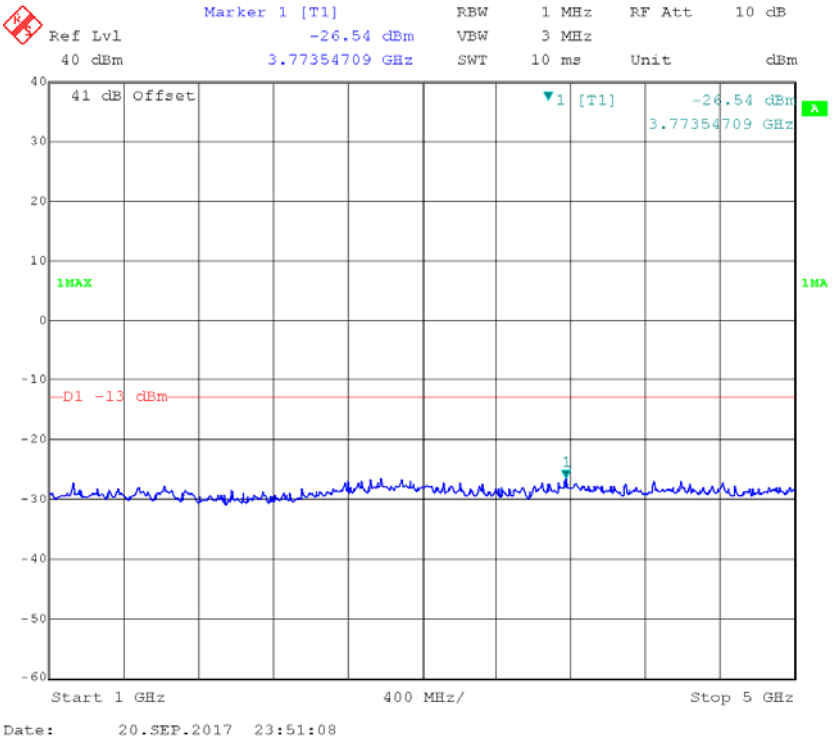


FCC PART 22

454.0125 MHz –FM Mode(12.5kHz was the worst),High Power

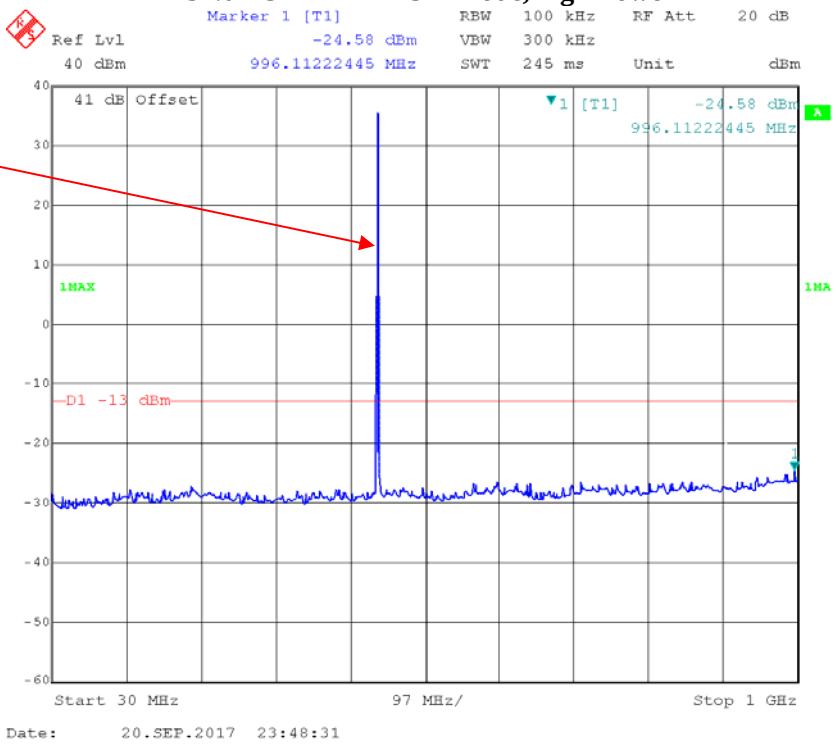
Fundamental

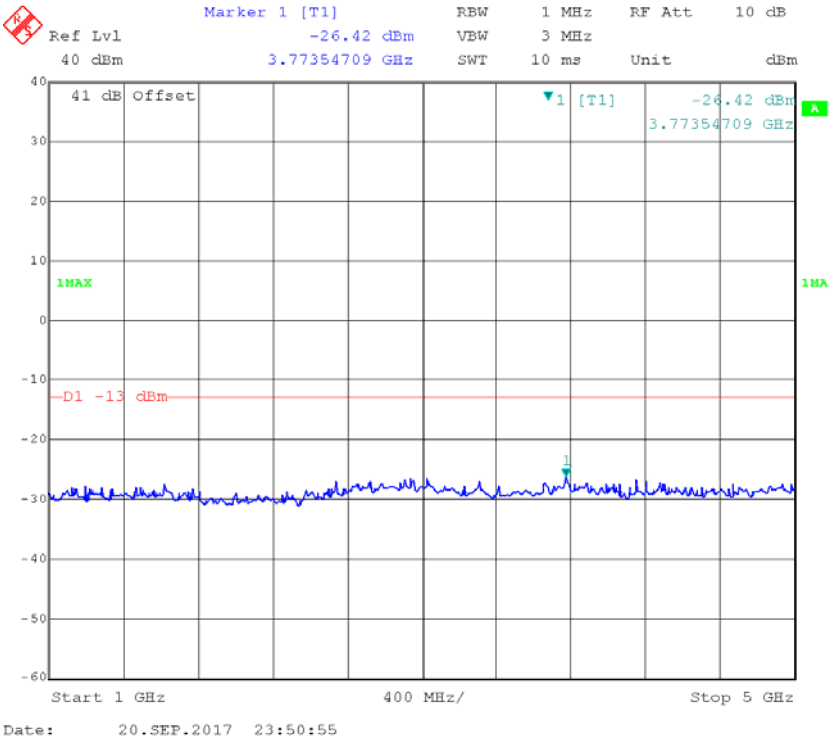




FCC PART 22
454.0125 MHz – 4FSK Mode,High Power

Fundamental

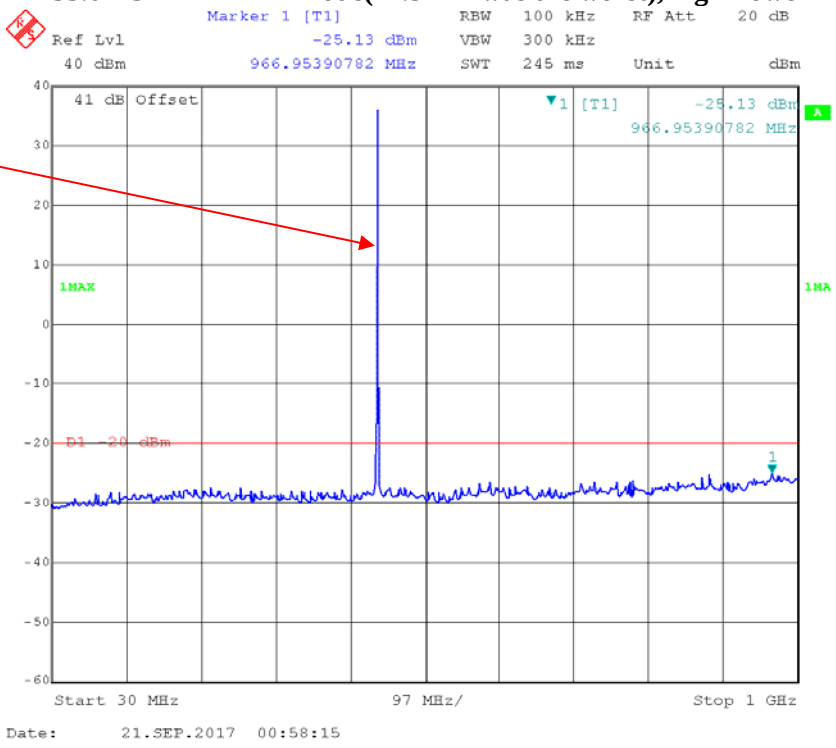


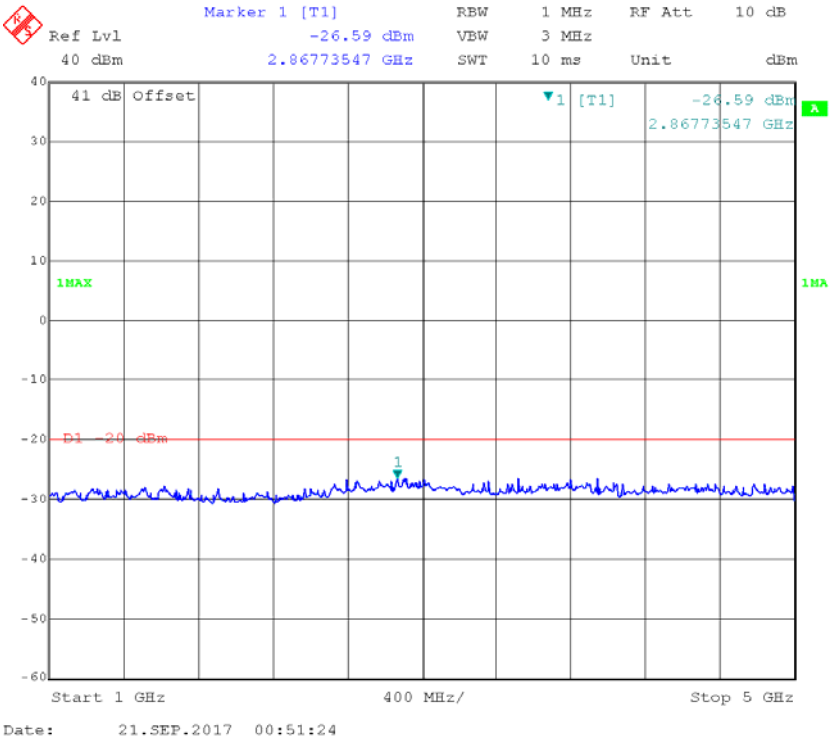


FCC PART 74

455.0125 MHz – FM Mode(12.5kHz was the worst),High Power

Fundamental

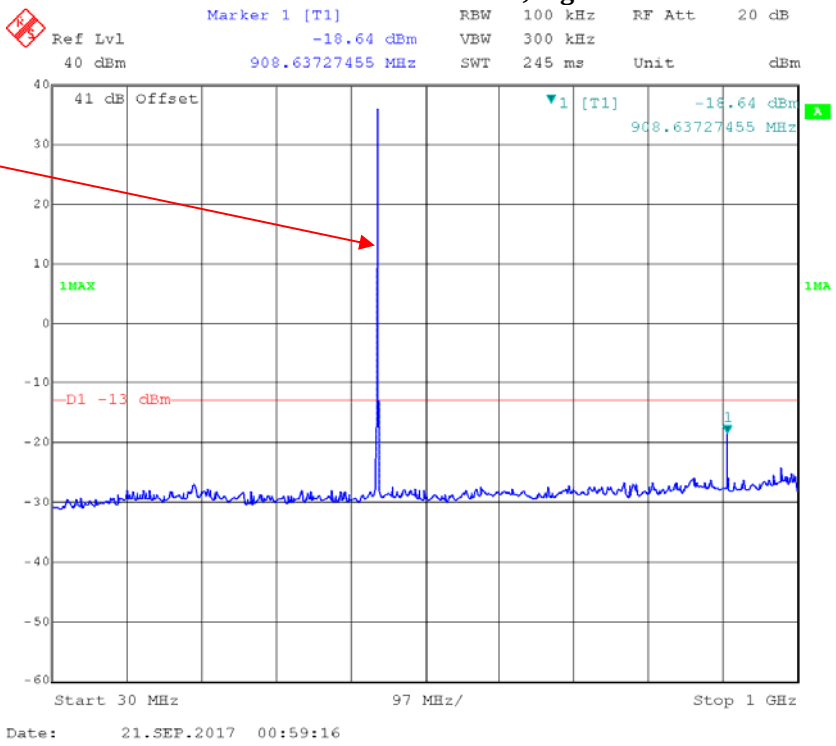


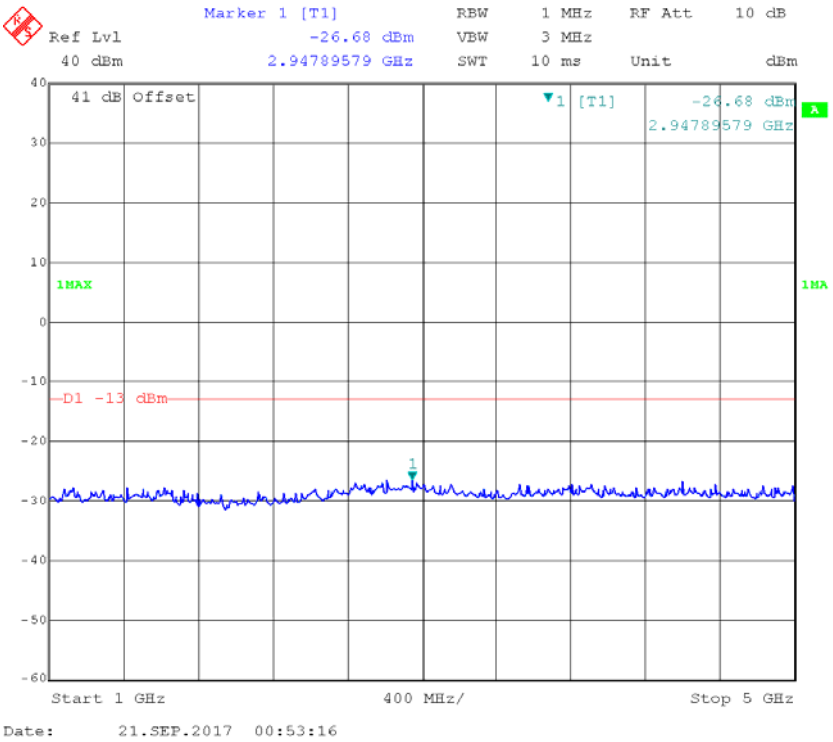


FCC PART 74

455.0125 MHz – 4FSK Mode,High Power

Fundamental





FCC §2.1053 & §22.861 & §90.210& §74.462 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053 and §22.861 and §90.210& §74.462

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	E8247C	MY43321350	2016-09-23	2017-09-22
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2014-11-06	2017-11-05
HP	Amplifier	8447E	2434A02181	2016-09-01	2017-09-01
R&S	EMI Test Receiver	ESCI	100224	2016-09-01	2017-08-31
N/A	Coaxial Cable	4m	N/A	2016-09-01	2017-09-01
N/A	Coaxial Cable	0.75m	N/A	2016-09-01	2017-09-01
N/A	Coaxial Cable	10m	N/A	2016-09-01	2017-09-01
Mini-Circuit	Amplifier	ZVA-213-S+	SN054201245	2017-02-19	2018-02-19
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016-12-08	2017-12-08
N/A	Coaxial Cable	4m	N/A	2016-09-01	2017-09-01
N/A	Coaxial Cable	8m	N/A	2016-09-01	2017-09-01
HP	Signal Generator	1026	320408	2016-12-08	2017-12-08

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

For part 90:
Spurious emissions in dB =10 1g (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB =50+10 Log_{10} (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

For part 22:
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

For part 74:

On any frequency removed from the assigned frequency by more than 250 percent on the authorized bandwidth; at least 43 plus 10 log^{10} (mean output power, in watts) dB.

Test Data

Environmental Conditions

Temperature:	27.1 °C
Relative Humidity:	50%
ATM Pressure:	101.2 kPa

The testing was performed by Steven Zuo on 2017-08-28.

Test Mode: Transmitting(T03-00303-GCAA was the worst)

Part 90:

Frequency	Polar	S.A. Reading	S.G. Level	Antenna Gain	Cable Loss	Absolute Level	Limit	Margin
MHz	H/V	dBµV	dBm	dBd/dBi	dB	dBm	dBm	dB
FM, 12.5 kHz, Frequency: 453.2125 MHz								
906.425	H	33.35	-40.9	0.0	1.1	-42.0	-20.0	22.0
906.425	V	36.84	-34.1	0.0	1.1	-35.2	-20.0	15.2
1359.638	H	53.50	-59.9	8.7	1.2	-52.4	-20.0	32.4
1359.638	V	57.63	-56.5	8.7	1.2	-49.0	-20.0	29.0
1812.850	H	50.75	-63.4	11.1	0.7	-53.0	-20.0	33.0
1812.850	V	52.69	-62.1	11.1	0.7	-51.7	-20.0	31.7
2266.063	H	46.06	-66.2	11.1	1.2	-56.3	-20.0	36.3
2266.063	V	48.19	-64	11.1	1.2	-54.1	-20.0	34.1
2719.275	H	55.23	-57.1	13.1	1.3	-45.3	-20.0	25.3
2719.275	V	55.97	-56.4	13.1	1.3	-44.6	-20.0	24.6
3172.488	H	47.97	-62.1	13.5	1.6	-50.2	-20.0	30.2
3172.488	V	49.27	-60.9	13.5	1.6	-49.0	-20.0	29.0
3625.700	H	45.18	-64.7	14.1	1.6	-52.2	-20.0	32.2
3625.700	V	45.93	-64	14.1	1.6	-51.5	-20.0	31.5
4FSK, 12.5kHz, Frequency: 453.2125 MHz								
906.425	H	31.62	-42.6	0.0	1.1	-43.7	-20.0	23.7
906.425	V	36.33	-34.6	0.0	1.1	-35.7	-20.0	15.7
1359.638	H	53.05	-60.3	8.7	1.2	-52.8	-20.0	32.8
1359.638	V	56.37	-57.7	8.7	1.2	-50.2	-20.0	30.2
1812.850	H	49.10	-65.1	11.1	0.7	-54.7	-20.0	34.7
1812.850	V	51.11	-63.6	11.1	0.7	-53.2	-20.0	33.2
2266.063	H	45.85	-66.4	11.1	1.2	-56.5	-20.0	36.5
2266.063	V	47.96	-64.2	11.1	1.2	-54.3	-20.0	34.3
2719.275	H	53.83	-58.5	13.1	1.3	-46.7	-20.0	26.7
2719.275	V	54.85	-57.6	13.1	1.3	-45.8	-20.0	25.8
3172.488	H	47.61	-62.5	13.5	1.6	-50.6	-20.0	30.6
3172.488	V	48.52	-61.6	13.5	1.6	-49.7	-20.0	29.7
3625.700	H	44.35	-65.6	14.1	1.6	-53.1	-20.0	33.1
3625.700	V	45.39	-64.5	14.1	1.6	-52.0	-20.0	32.0

Part 22:

Frequency	Polar	S.A. Reading	S.G. Level	Antenna Gain	Cable Loss	Absolute Level	Limit	Margin
MHz	H/V	dBµV	dBm	dBd/dBi	dB	dBm	dBm	dB
FM(12.5kHz was the worst), Frequency: 454.0125 MHz								
908.025	H	32.43	-41.8	0.0	1.1	-42.9	-13.0	29.9
908.025	V	36.81	-34.1	0.0	1.1	-35.2	-13.0	22.2
1362.038	H	54.52	-58.8	8.7	1.2	-51.3	-13.0	38.3
1362.038	V	56.81	-57.3	8.7	1.2	-49.8	-13.0	36.8
1816.050	H	49.40	-64.7	11.2	0.7	-54.2	-13.0	41.2
1816.050	V	52.11	-62.6	11.2	0.7	-52.1	-13.0	39.1
2270.063	H	46.11	-66.1	11.1	1.2	-56.2	-13.0	43.2
2270.063	V	49.35	-62.8	11.1	1.2	-52.9	-13.0	39.9
2724.075	H	54.38	-57.9	13.1	1.3	-46.1	-13.0	33.1
2724.075	V	55.06	-57.3	13.1	1.3	-45.5	-13.0	32.5
3178.088	H	48.75	-61.3	13.5	1.6	-49.4	-13.0	36.4
3178.088	V	49.42	-60.7	13.5	1.6	-48.8	-13.0	35.8
3632.100	H	46.72	-63.1	14.1	1.6	-50.6	-13.0	37.6
3632.100	V	47.83	-62	14.1	1.6	-49.5	-13.0	36.5
4FSK, 12.5 kHz, Frequency: 454.0125 MHz								
908.025	H	30.87	-43.3	0.0	1.1	-44.4	-13.0	31.4
908.025	V	36.15	-34.8	0.0	1.1	-35.9	-13.0	22.9
1362.038	H	52.59	-60.8	8.7	1.2	-53.3	-13.0	40.3
1362.038	V	56.12	-57.9	8.7	1.2	-50.4	-13.0	37.4
1816.050	H	48.16	-66	11.2	0.7	-55.5	-13.0	42.5
1816.050	V	51.11	-63.6	11.2	0.7	-53.1	-13.0	40.1
2270.063	H	45.33	-66.9	11.1	1.2	-57.0	-13.0	44.0
2270.063	V	47.78	-64.4	11.1	1.2	-54.5	-13.0	41.5
2724.075	H	53.66	-58.6	13.1	1.3	-46.8	-13.0	33.8
2724.075	V	54.28	-58.1	13.1	1.3	-46.3	-13.0	33.3
3178.088	H	47.31	-62.7	13.5	1.6	-50.8	-13.0	37.8
3178.088	V	48.29	-61.8	13.5	1.6	-49.9	-13.0	36.9
3632.100	H	46.23	-63.6	14.1	1.6	-51.1	-13.0	38.1
3632.100	V	47.37	-62.5	14.1	1.6	-50.0	-13.0	37.0

Part 74:

Frequency	Polar	S.A. Reading	S.G. Level	Antenna Gain	Cable Loss	Absolute Level	Limit	Margin
MHz	H/V	dBµV	dBm	dBd/dBi	dB	dBm	dBm	dB
FM(12.5 kHz was the worst), Frequency: 455.0125 MHz								
910.025	H	41.06	-33.1	0.0	1.1	-34.2	-13.0	21.2
910.025	V	42.58	-28.3	0.0	1.1	-29.4	-13.0	16.4
1365.038	H	53.98	-59.4	8.7	1.2	-51.9	-13.0	38.9
1365.038	V	56.11	-57.9	8.7	1.2	-50.4	-13.0	37.4
1820.050	H	49.54	-64.5	11.2	0.7	-54.0	-13.0	41.0
1820.050	V	51.35	-63.2	11.2	0.7	-52.7	-13.0	39.7
2275.063	H	46.04	-66.2	11.1	1.2	-56.3	-13.0	43.3
2275.063	V	48.63	-63.5	11.1	1.2	-53.6	-13.0	40.6
2730.075	H	51.34	-60.9	13.1	1.3	-49.1	-13.0	36.1
2730.075	V	54.52	-57.9	13.1	1.3	-46.1	-13.0	33.1
4FSK, 12.5 kHz Frequency: 455.0125 MHz								
910.025	H	40.25	-33.9	0.0	1.1	-35.0	-13.0	22.0
910.025	V	42.09	-28.8	0.0	1.1	-29.9	-13.0	16.9
1365.038	H	54.36	-59	8.7	1.2	-51.5	-13.0	38.5
1365.038	V	55.60	-58.4	8.7	1.2	-50.9	-13.0	37.9
1820.050	H	48.71	-65.3	11.2	0.7	-54.8	-13.0	41.8
1820.050	V	50.25	-64.3	11.2	0.7	-53.8	-13.0	40.8
2275.063	H	45.96	-66.3	11.1	1.2	-56.4	-13.0	43.4
2275.063	V	47.58	-64.6	11.1	1.2	-54.7	-13.0	41.7
2730.075	H	52.36	-59.9	13.1	1.3	-48.1	-13.0	35.1
2730.075	V	51.26	-61.1	13.1	1.3	-49.3	-13.0	36.3

FCC §2.1055 & § 22.355 & §90.213&§74.464- FREQUENCY STABILITY

Applicable Standard

FCC §2.1055, § 22.355, §90.213, §74.464

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	831259/019	2017-07-18	2018-07-18
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2016-09-10	2017-09-09
UNI-T	Multimeter	UT39A	M130199938	2017-04-10	2018-04-10
HP	RF Communications Test Set	8920A	00 235	2017-07-11	2018-07-11
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2017-05-06	2018-05-06
E-Microwave	RF Attenuator	20dB	20dB-1	Each Time	/
E-Microwave	RF Attenuator	20dB	20dB-2	Each Time	/
Pro instrument	DC Power Supply	pps3300	N/A	N/A	N/A
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The power leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

Test Data

Environmental Conditions

Temperature:	26.5 °C
Relative Humidity:	53%
ATM Pressure:	99.9kPa

The testing was performed by Pean Zhu on 2017-08-21.

Test Mode: Transmitting

FCC PART 90:

Reference Frequency: 453.2125 MHz, Limit: 2.5 ppm			
Temerature	**Voltage**	**Measured**	**Frequency Error**
℃	**V_{DC}**	**MHz**	**ppm**
-30	7.4	453.212439	-0.13
-20		453.212446	-0.12
-10		453.212431	-0.15
0		453.212431	-0.15
10		453.212421	-0.17
20		453.212417	-0.18
30		453.212431	-0.15
40		453.212431	-0.15
50		453.212436	-0.14
25	6.8	453.212419	-0.18
25	8.4	453.212450	-0.11

FCC PART 22:

Reference Frequency: 454.0125 MHz, Limit: 2.5 ppm			
Temerature	**Voltage**	**Measured**	**Frequency Error**
℃	**V_{DC}**	**MHz**	**ppm**
-30	7.4	454.012428	-0.16
-20		454.012428	-0.16
-10		454.012416	-0.19
0		454.012434	-0.15
10		454.012428	-0.16
20		454.012416	-0.19
30		454.012434	-0.15
40		454.012454	-0.10
50		454.012429	-0.16
25	6.8	454.012417	-0.18
25	8.4	454.012419	-0.18

FCC PART 74:

Reference Frequency: 455.0125 MHz, Limit: 2.5 ppm			
Temerature	**Voltage**	**Measured**	**Frequency Error**
℃	**V_{DC}**	**MHz**	**ppm**
-30	7.4	455.012489	-0.02
-20		455.012443	-0.13
-10		455.012481	-0.04
0		455.012443	-0.13
10		455.012481	-0.04
20		455.012421	-0.17
30		455.012493	-0.02
40		455.012417	-0.18
50		455.012494	-0.01
25	6.8	455.012465	-0.08
25	8.4	455.012413	-0.19

FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

FCC §90.214

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSEM	831259/019	2017-07-18	2018-07-18
HP	RF Communications Test Set	8920A	00 235	2017-07-11	2018-07-11
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2017-05-06	2018-05-06
E-Microwave	RF Attenuator	20dB	20dB-1	Each Time	/
E-Microwave	RF Attenuator	20dB	20dB-2	Each Time	/
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

The tests and measurements indicated in TIA-603-D §2.2.19.2.

Test Data

Environmental Conditions

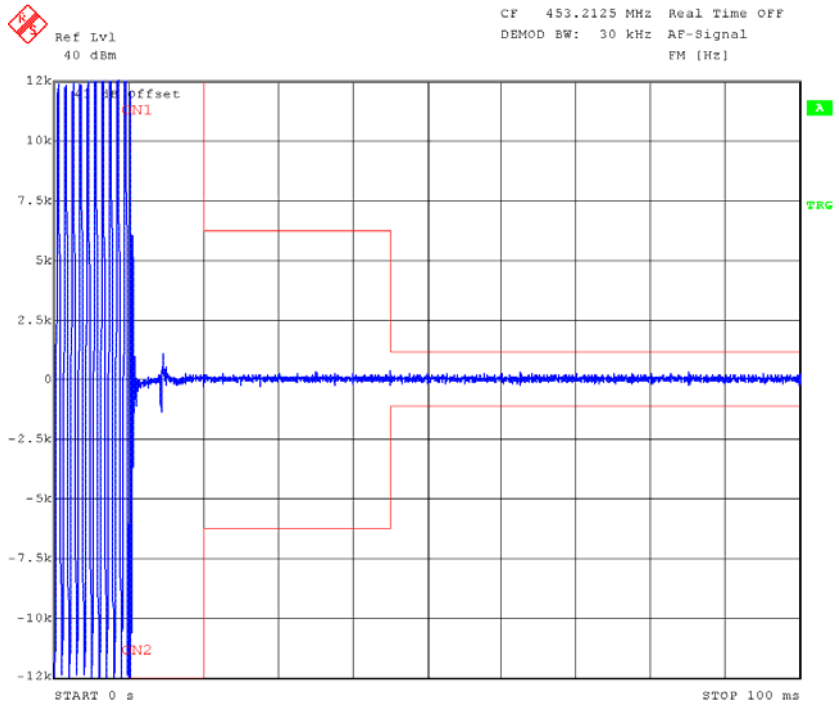
Temperature:	25.4 °C
Relative Humidity:	53%
ATM Pressure:	100.5 kPa

The testing was performed by Pean Zhu on 2017-09-21

Channel Spacing (kHz)	Transient Period (ms)	Transient Frequency	Result
12.5	<10(t_1)	±12.5 kHz	Pass
	<25(t_2)	±6.25 kHz	
	<10(t_3)	±12.5 kHz	

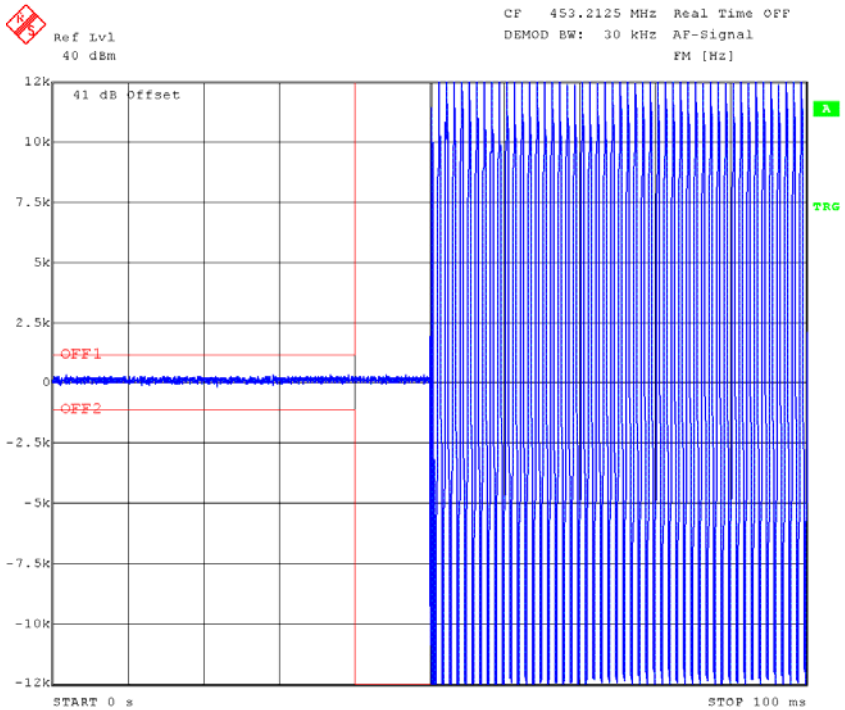
Please refer to the following plots.

Turn on – 453.2125 MHz, High power level



Date: 21.SEP.2017 01:27:48

Turn off – 453.2125 MHz, High power level



Date: 21.SEP.2017 01:41:33

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