BACL
Bay Area Compliance Labs Corp.

FCC PART 90

TEST REPORT

For

FUJIAN NEW CENTURY COMMUNICATIONS CO., LTD

NO.1 FENGSHOU RD., ZHAOFENG IND. ZONE FENGZE DISTRICT, QUANZHOU, FUJIAN, CHINA.

FCC ID: VO6CDR-300UV

Report Type:	Product Type:
Original Report	Digital Mini Mobile Radio

Project Engineer:	Stone Zhang _Stone Zhang_
Report Number:	RXM201208050-00A
Report Date:	2021-06-29
Reviewed By:	Oscar Ye EMC Manager _Oscar.Ye_
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	FUJIAN NEW CENTURY COMMUNICATIONS CO., LTD
Tested Model:	CDR-300UV
Series Model:	CDR-200UV
Product Type:	Digital Mini Mobile Radio
Power Supply:	DC 13.8V
Rated Power:	UHF: High power: 20W, Low power: 5W VHF: High power: 20W, Low power: 5W
RF Function:	UHF, VHF
Operating Band/Frequency:	UHF: 400-480 MHz VHF: 136-174 MHz
Modulation Type:	FM, 4FSK
Channel Separation:	12.5 kHz
Antenna Type:	Monopole antenna
*Maximum Antenna Gain:	5.5 dBi

Note: The maximum antenna gain was declared by the applicant.

Note: The difference between tested model and series model was explained in the attached declaration letter.

*All measurement and test data in this report was gathered from production sample serial number:
RXM201208050-1 (Assigned by BACL, Kunshan). The EUT was received on 2020-12-08.*

Objective

This test report is prepared on behalf of *FUJIAN NEW CENTURY COMMUNICATIONS CO., LTD* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal/grant.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as Part the following individual parts:

Pat90-Private Land Mobile Radio Service

Applicable Standards: ANSI C63.26:2015.

All emissions measurement was performed atBay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
Unwanted Emissions, radiated	30MHz~1GHz	5.91dB
	1GHz~6GHz	4.68dB
	6 GHz ~18 GHz	4.92dB
	18 GHz~40 GHz	5.21dB
Occupied Channel Bandwidth		±5%
RF output power, conducted		±0.61dB
Unwanted Emissions, conducted		±1.5dB
Temperature		±1℃
Humidity		±5%
DC and low frequency voltages		±0.4%
Duty Cycle		1%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Huaxiang	50OhmCoaxial load	4.3/10TF20-8	17011301
ZHAOXIN	DC Power Supply	PS-6005D	DC003

External I/O Cable

Cable Description	Length (m)	From Port	To Port
Power Cable1	2.0	EUT	DC Source
Power Cable2	1.0	DC Source	AC Source

Block Diagram of Test Setup

For Radiated Emissions (Below 1GHz):

Turntable
2m Diameter

AC Souce

EUT   DC Souce

Load

1.0 Meter

Non-Conductive Table
80cm above Ground Plane

1.5 Meter
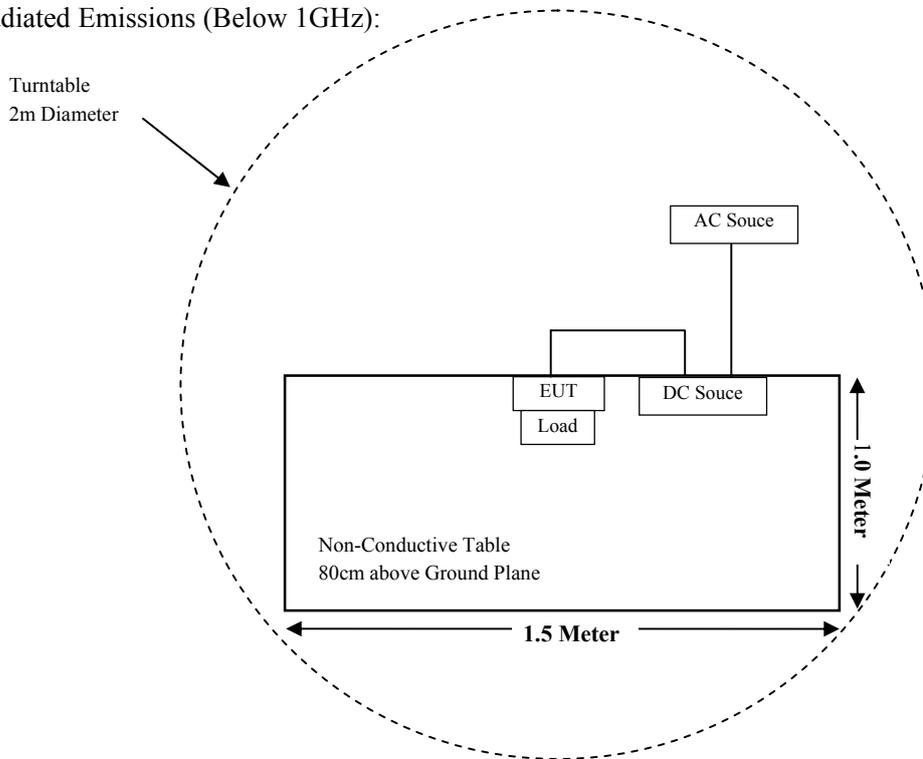
For Radiated Emissions (Above 1GHz):

Turntable
2m Diameter

AC Souce

DC Source   EUT

Load

1.0 Meter

Non-Conductive Table
150cm above Ground Plane

1.5 Meter
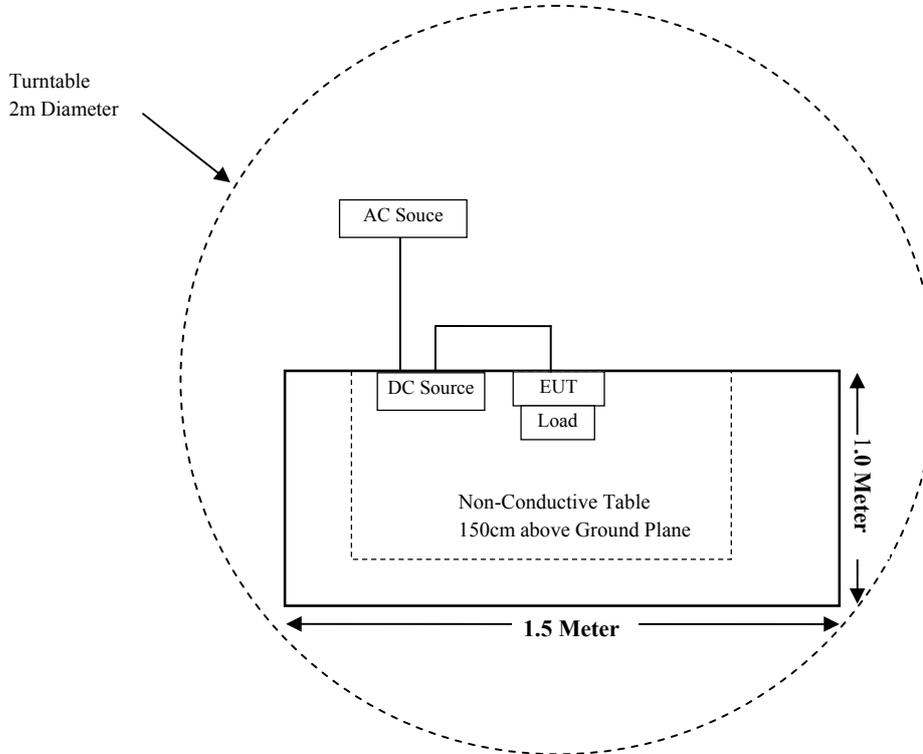
SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1310, §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§2.1046, §90.205	RF Output Power	Compliant
§2.1047	Modulation Characteristic	Compliant
§2.1049; §90.209; §90.210	Occupied Bandwidth &Emission Mask	Compliant
§2.1051; §90.210	Spurious Emission at Antenna Terminal	Compliant
§2.1053; §90.210	Spurious Radiated Emissions	Compliant
§2.1055; §90.213	Frequency stability	Compliant
§90.214	Transient Frequency Behavior	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2020-12-14	2021-12-13
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2020-08-05	2023-08-04
Sunol Sciences	Bilog antenna	JB3	A060217	2020-11-28	2023-11-27
HP	Signal Generator	N5183A	MY51040755	2020-11-27	2021-11-26
Sonoma Instrunent	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
Radiated Emission Test（Chamber 2#）					
HP	Signal Generator	N5183A	MY51040755	2020-11-27	2021-11-26
Rohde & Schwarz	EMI Test Receiver	ESU40	100207/040	2021-04-01	2022-03-31
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2020-07-15	2023-07-14
ETS-LINDGREN	Horn Antenna	3115	6229	2020-01-07	2023-01-06
A.H.Systems, inc	Amplifier	PAM-0118P	512	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2020-08-15	2021-08-14
RF Conducted Test					
HP	RF communication test SET.	8920B	US36141849	2021-04-01	2022-03-31
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048/027	2020-11-27	2021-11-26
Narda	Attenuator	30dB	030	2020-08-15	2021-08-14
BACL	Temperature & Humidity Chamber	BTH-150	30023	2020-12-20	2021-12-19
ZHAOXIN	DC Power Supply	RXN-605D	DC002	2020-10-10	2021-10-09
FUJIAN NEW CENTURY	RF Cable	FUJIAN NEW CENTURY C01	C01	Each Time	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements thattraceable to National Primary Standards and International System of Units (SI).

FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to §2.1091 and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time |E|, |H| or S (minutes)
0.3- 3.0	614	1.63	(100)*	6
3.0 - 30	1842/f	4.89/f	(900/f^2)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6

f = frequency in MHz; * = Plane-wave equivalent power density;

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

For worst case:

Frequency Range (MHz)	Antenna Gain (dBi)	coaxial Cable loss (dB)	Antenna Gain-coaxial Cable loss		Tune-up Conducted Power		Duty cycle	Evaluation Distance (cm)	Power Density (mW/cm²)	Power Density Limit (mW/cm²)
			(dBi)	(numeric)	(dBm)	(mW)				
136-174	5.5	0.8	4.7	2.95	43.00	19952.62	50%	50	0.9371	1.0
400-480	5.5	0.8	4.7	2.95	43.00	19952.62	50%	50	0.9371	1.3

Note:

1.The tune-up output power was declared by the Manufacturer.
2. The typical max antenna gain is 5.5dBi was provided by the Manufacturer

Antenna Type	Antenna Gain
Monopole antenna	5.5

3.typical use qualifies for a maximum duty cycle is 50%
4.A typical installation consists of system with a coaxial cable has a loss 0.8 dB.

Result: The device meets FCC MPE at 50cm distance

FCC §2.1046 & §90.205 RF OUTPUT POWER

Applicable Standard

FCC §2.1046 & §90.205

Test Procedure

Conducted RF Output Power:

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

Spectrum Analyzer Setting:

RB/W   VideoB/W
100 kHz   300kHz

Test Data

Environmental Conditions

Temperature:	24.9 ℃
Relative Humidity:	53%
ATM Pressure:	101.7 kPa

The testing was performed by Stone Zhang on 2021-06-24.

EUT Operation Mode: Transmitting

Test Result: Compliant.

Please refer to following table.

UHF:

Modulation Mode	Channel Spacing(kHz)	fc (MHz)	Conducted Output Power (W)	
			High power level	**Low power level**
FM	12.5 kHz	400.025	19.41	4.95
		440.000	16.98	4.60
		479.975	17.91	4.74
4FSK	12.5 kHz	400.025	19.28	4.98
		440.000	17.02	4.61
		479.975	18.07	4.78

Note: The rated high power level is 20W, and rated low power level is 5W.

VHF:

Modulation Mode	Channel Spacing(kHz)	fc (MHz)	Conducted Output Power (W)	
			High power level	Low power level
FM	12.5 kHz	136.025	18.37	4.92
		155.000	18.62	4.56
		173.975	17.02	4.69
4FSK	12.5 kHz	136.025	18.49	4.94
		155.000	18.75	4.58
		173.975	17.14	4.72

Note: The rated high power level is 20W, and rated low power level is 5W.

FCC §2.1047 - MODULATION CHARACTERISTIC

Applicable Standard

FCC §2.1047

(a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
(b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

Test Procedure

Test Method: ANSI C63.26:2015.

Test Data

Environmental Conditions

Temperature:	24.9 ℃
Relative Humidity:	52%
ATM Pressure:	101.7 kPa

The testing was performed by Stone Zhang 0n 2021-06-24.

Test Mode: Transmitting

Test Result: Compliant.

MODULATION LIMITING

Carrier Frequency: 400.025 MHz, Channel Spacing = 12.5 kHz

Audio Frequency (Hz)	Instantaneous		steady-state		Limit
	Deviation (@+20dB)	Deviation (@-20dB)	Deviation (@+20dB)	Deviation (@-20dB)	
	（kHz）	（kHz）	（kHz）	（kHz）	（kHz）
300	0.602	0.033	0.601	0.036	2.5
400	0.606	0.129	0.605	0.126	2.5
500	0.905	0.160	0.907	0.168	2.5
600	1.060	0.187	1.060	0.192	2.5
700	1.184	0.205	1.184	0.205	2.5
800	1.401	0.236	1.409	0.222	2.5
900	1.626	0.337	1.625	0.326	2.5
1000	1.813	0.373	1.808	0.368	2.5
1200	1.935	0.337	1.934	0.334	2.5
1400	1.970	0.329	1.975	0.327	2.5
1600	1.994	0.442	1.996	0.447	2.5
1800	2.105	0.554	2.104	0.556	2.5
2000	2.208	0.619	2.208	0.618	2.5
2200	2.210	0.707	2.209	0.709	2.5
2400	1.818	0.845	1.811	0.840	2.5
2600	1.706	0.834	1.705	0.837	2.5
2800	1.609	0.868	1.606	0.866	2.5
3000	1.406	0.848	1.409	0.840	2.5
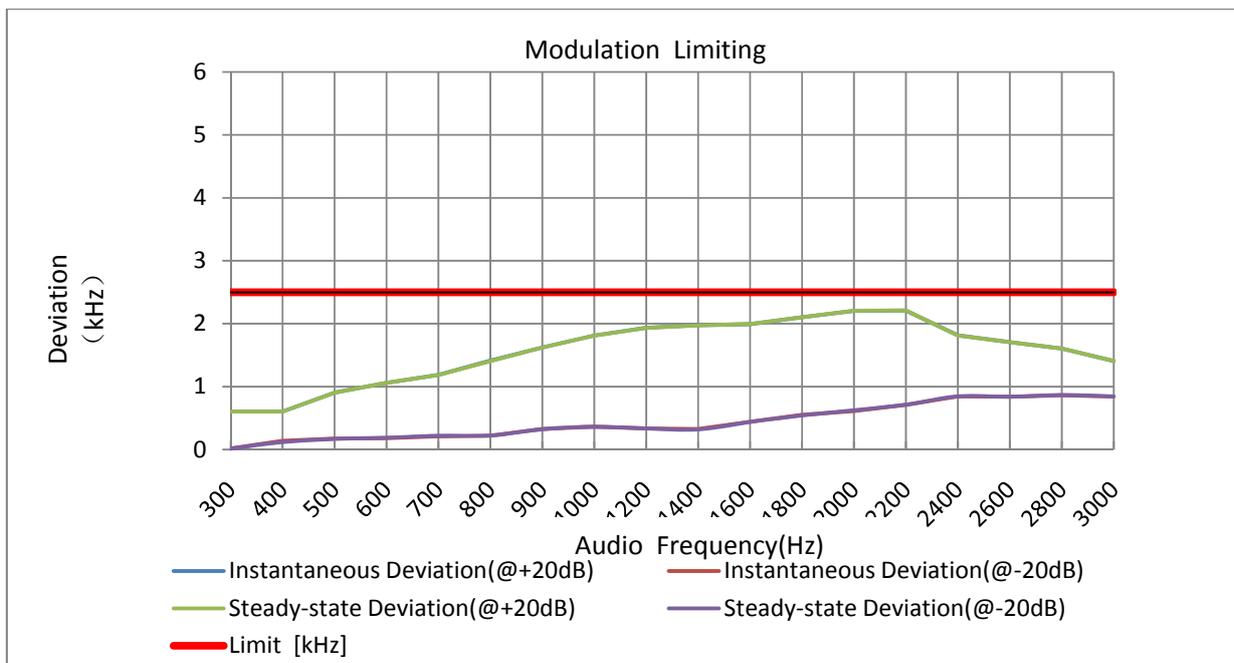
Audio Frequency Response
Carrier Frequency: 400.025 MHz, Channel Spacing = 12.5 kHz

Carrier Frequency：400.025 MHz (12.5k)	
Audio Frequency	Response Attenuation
（Hz）	（dB）
300	-13.14
400	-9.20
500	-7.07
600	-4.87
700	-3.13
800	-2.49
900	-0.88
1000	0.00
1200	1.59
1400	2.55
1600	3.72
1800	4.42
2000	5.59
2200	5.29
2400	6.16
2600	6.32
2800	6.37
3000	6.40
3125	6.65
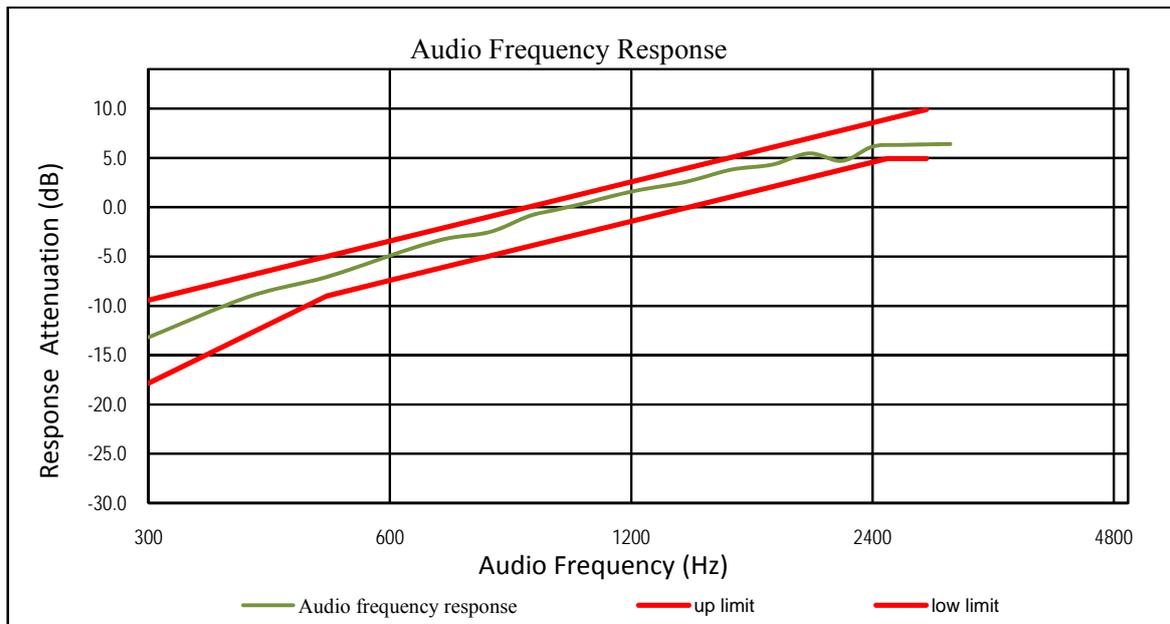
Audio Frequency Response

Audio Frequency Low Pass Filter Response
Carrier Frequency: 400.025MHz，Channel Spacing = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation （dB）	Limit (dB)
3.0	-2.8	0
3.5	-8.0	-6.7
4.0	-14.2	-12.5
5.0	-26.2	-22.2
7.0	-38.6	-36.8
10.0	-54.8	-52.3
15.0	-72.4	-69.9
20.0	-83.5	-82.5
30.0	-84.5	-82.5
50.0	-85.8	-82.5
70.0	-86.7	-82.5

Audio Low Pass Filter Response

MODULATION LIMITING
Carrier Frequency: 440.000 MHz, Channel Spacing = 12.5 kHz

Audio Frequency (Hz)	Instantaneous		steady-state		Limit
	Deviation (@+20dB)	Deviation (@-20dB)	Deviation (@+20dB)	Deviation (@-20dB)	
	（kHz）	（kHz）	（kHz）	（kHz）	（kHz）
300	0.603	0.024	0.603	0.037	2.5
400	0.603	0.129	0.605	0.154	2.5
500	0.903	0.166	0.909	0.172	2.5
600	1.058	0.199	1.063	0.189	2.5
700	1.182	0.215	1.183	0.218	2.5
800	1.405	0.239	1.408	0.230	2.5
900	1.626	0.322	1.623	0.339	2.5
1000	1.810	0.368	1.815	0.365	2.5
1200	1.933	0.333	1.937	0.332	2.5
1400	1.972	0.328	1.977	0.330	2.5
1600	1.996	0.443	1.994	0.442	2.5
1800	2.102	0.553	2.105	0.555	2.5
2000	2.202	0.621	2.204	0.617	2.5
2200	2.211	0.712	2.212	0.713	2.5
2400	1.814	0.849	1.811	0.845	2.5
2600	1.708	0.839	1.706	0.840	2.5
2800	1.605	0.865	1.606	0.864	2.5
3000	1.408	0.845	1.407	0.848	2.5
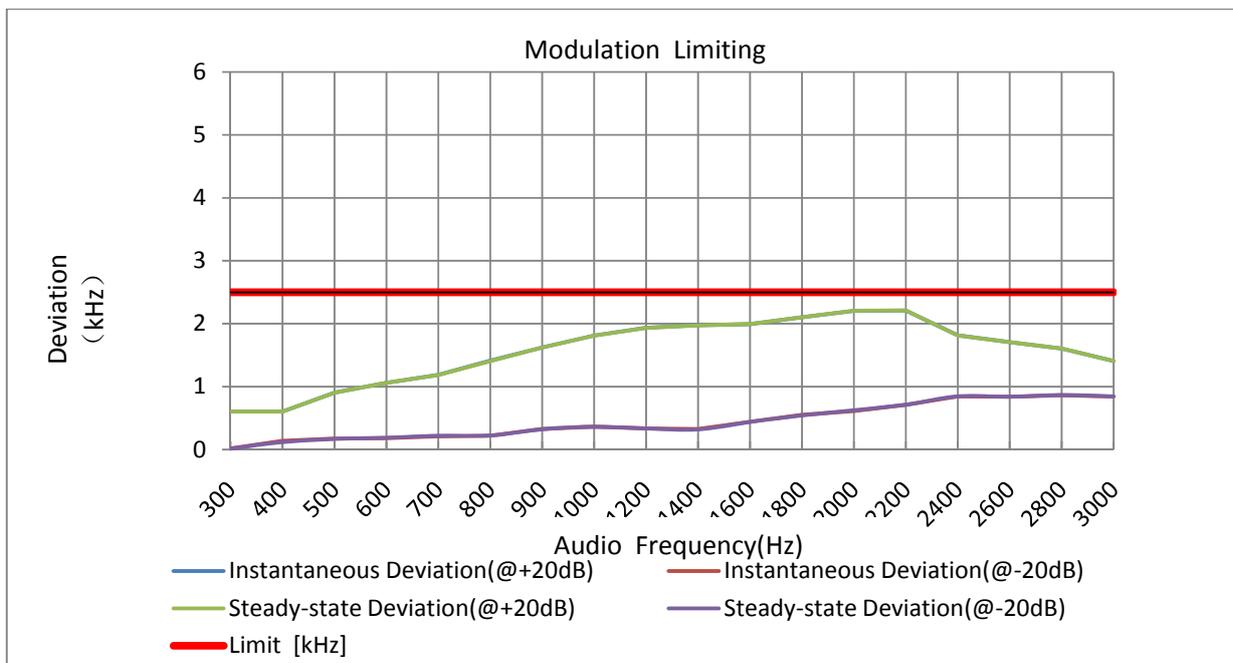
Audio Frequency Response
Carrier Frequency: 440.000 MHz, Channel Spacing = 12.5 kHz

Carrier Frequency：440.000 MHz (12.5k)	
Audio Frequency	Response Attenuation
（Hz）	（dB）
300	-13.07
400	-9.11
500	-7.03
600	-4.92
700	-3.23
800	-2.48
900	-0.82
1000	0.00
1200	1.51
1400	2.57
1600	3.88
1800	4.47
2000	5.41
2200	4.37
2400	6.16
2600	6.30
2800	6.37
3000	6.42
3125	6.56
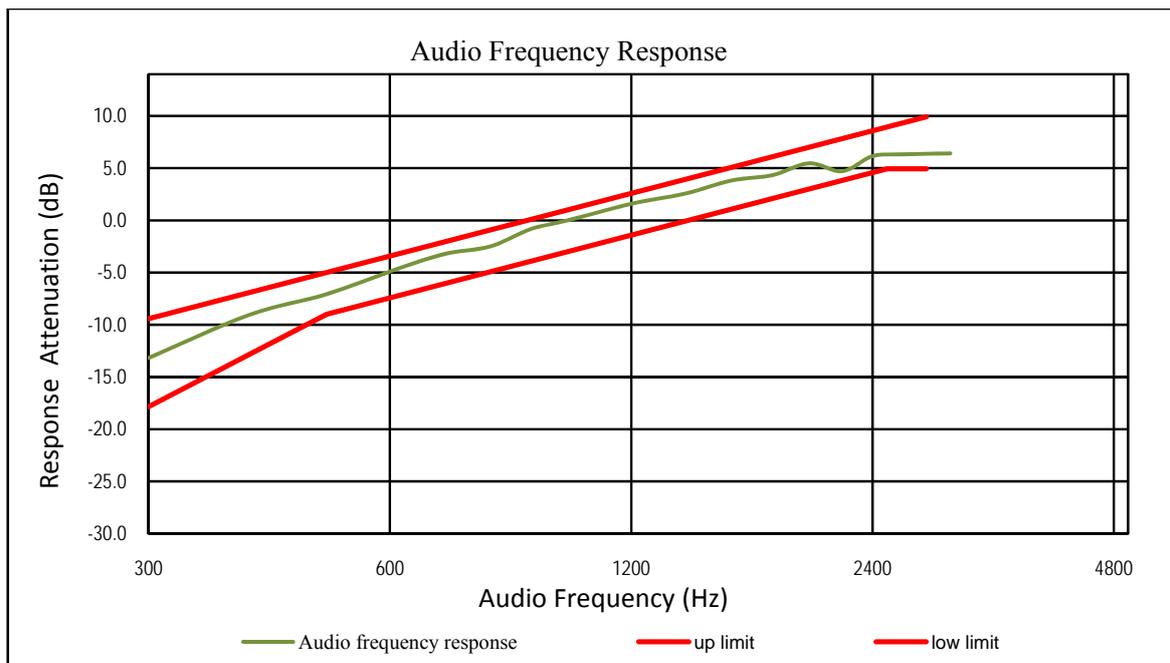
Audio Frequency Low Pass Filter Response
Carrier Frequency: 440.000MHz，Channel Spacing = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation （dB）	Limit (dB)
3.0	-2.3	0
3.5	-8.4	-6.7
4.0	-14.8	-12.5
5.0	-26.6	-22.2
7.0	-38.8	-36.8
10.0	-54.1	-52.3
15.0	-72.7	-69.9
20.0	-84.8	-82.5
30.0	-84.6	-82.5
50.0	-85.6	-82.5
70.0	-86.9	-82.5

Audio Low Pass Filter Response

MODULATION LIMITING

Carrier Frequency: 479.975 MHz, Channel Spacing = 12.5 kHz

Audio Frequency (Hz)	Instantaneous		steady-state		Limit
	Deviation (@+20dB)	Deviation (@-20dB)	Deviation (@+20dB)	Deviation (@-20dB)	
	（kHz）	（kHz）	（kHz）	（kHz）	（kHz）
300	0.603	0.027	0.605	0.032	2.5
400	0.606	0.120	0.607	0.150	2.5
500	0.908	0.175	0.908	0.162	2.5
600	1.061	0.190	1.061	0.199	2.5
700	1.185	0.200	1.188	0.216	2.5
800	1.409	0.239	1.402	0.222	2.5
900	1.622	0.339	1.627	0.339	2.5
1000	1.812	0.375	1.808	0.367	2.5
1200	1.937	0.340	1.937	0.338	2.5
1400	1.975	0.321	1.972	0.325	2.5
1600	1.992	0.450	1.994	0.452	2.5
1800	2.102	0.552	2.105	0.555	2.5
2000	2.209	0.612	2.207	0.614	2.5
2200	2.211	0.717	2.209	0.718	2.5
2400	1.814	0.850	1.813	0.848	2.5
2600	1.706	0.834	1.706	0.830	2.5
2800	1.605	0.870	1.610	0.866	2.5
3000	1.409	0.841	1.409	0.846	2.5
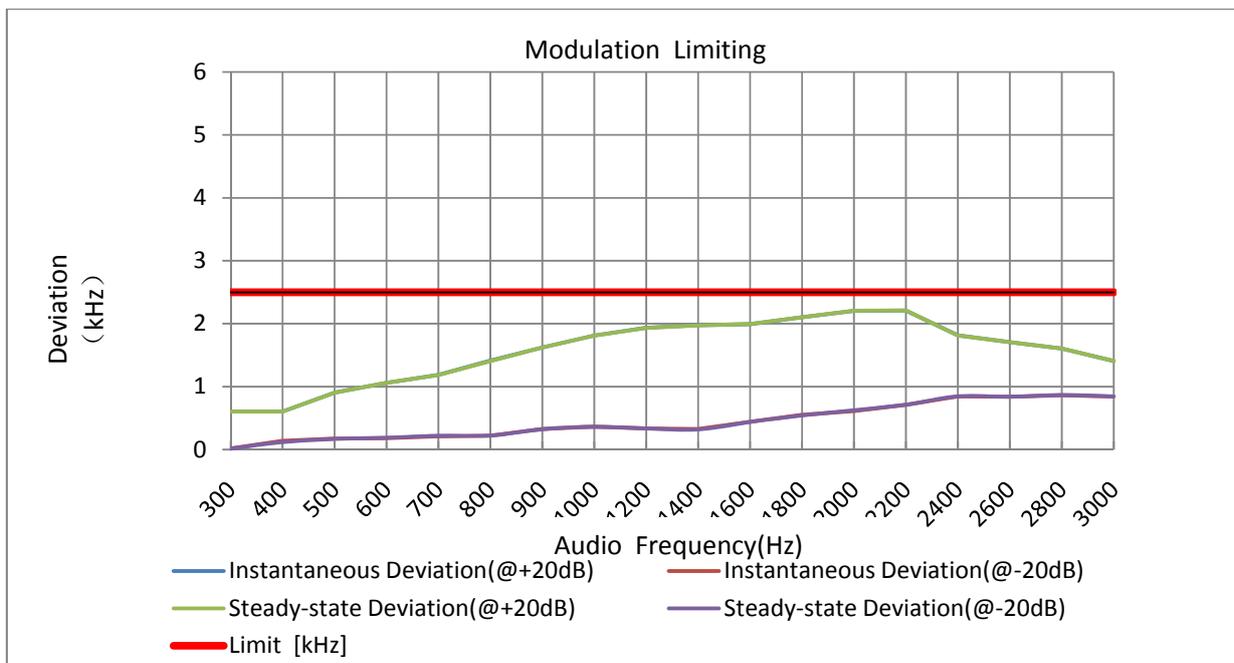
Audio Frequency Response
Carrier Frequency: 479.975MHz, Channel Spacing = 12.5 kHz

Carrier Frequency：479.975 MHz (12.5k)	
Audio Frequency	Response Attenuation
（Hz）	（dB）
300	-13.03
400	-9.15
500	-7.07
600	-4.99
700	-3.05
800	-2.47
900	-0.83
1000	0.00
1200	1.41
1400	2.54
1600	3.83
1800	4.37
2000	5.48
2200	4.87
2400	6.19
2600	6.30
2800	6.36
3000	6.41
3125	6.62
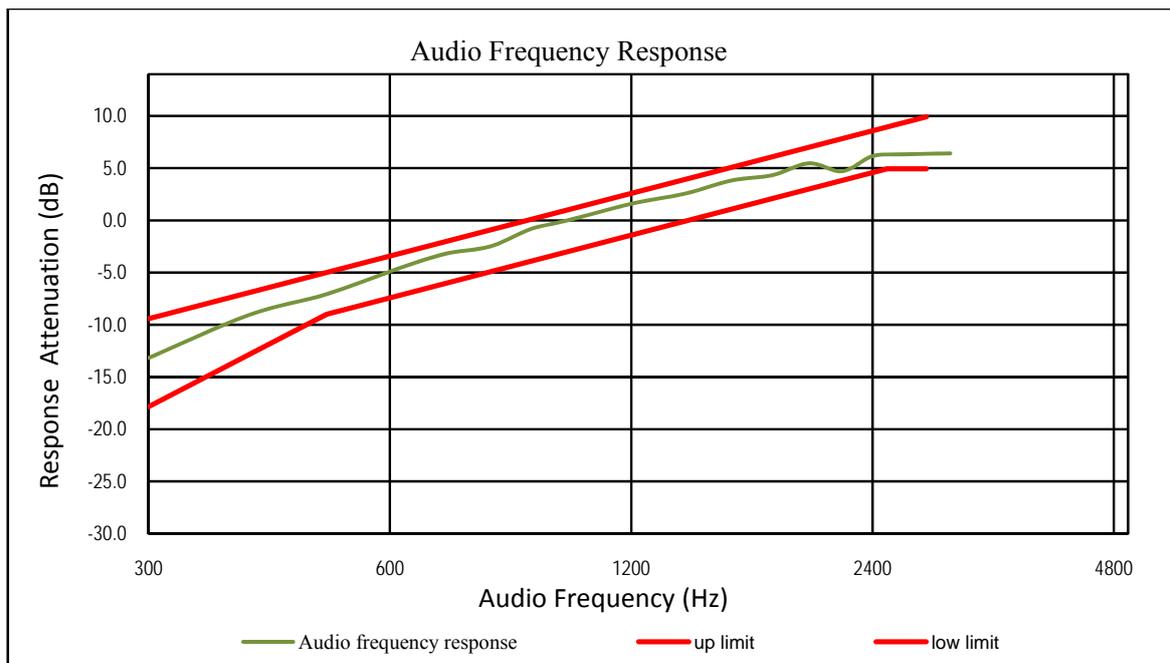
Audio Frequency Response

Audio Frequency Low Pass Filter Response
Carrier Frequency: 479.975MHz，Channel Spacing = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation （dB）	Limit (dB)
3.0	-2.9	0
3.5	-8.9	-6.7
4.0	-14.7	-12.5
5.0	-26.8	-22.2
7.0	-38.9	-36.8
10.0	-54.4	-52.3
15.0	-71.7	-69.9
20.0	-84.6	-82.5
30.0	-84.2	-82.5
50.0	-85.9	-82.5
70.0	-86.8	-82.5

Audio Low Pass Filter Response
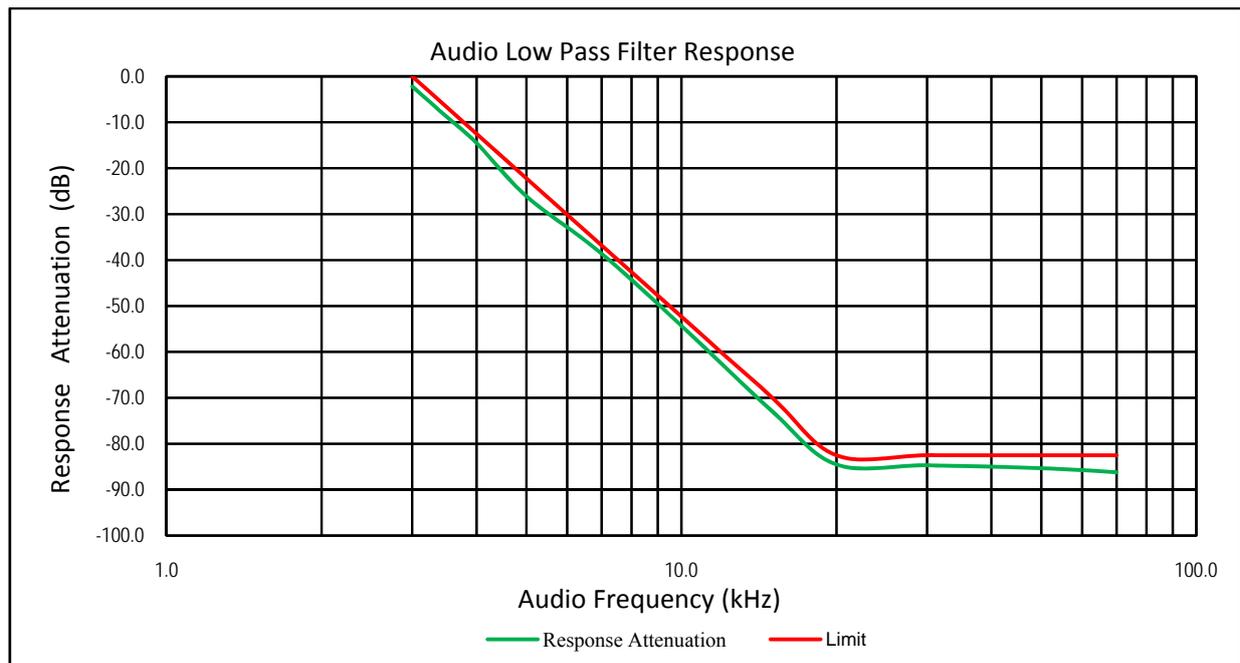
VHF:

MODULATION LIMITING
Carrier Frequency: 136.025 MHz, Channel Spacing = 12.5 kHz

Audio Frequency (Hz)	Instantaneous		steady-state		Limit
	Deviation (@+20dB)	Deviation (@-20dB)	Deviation (@+20dB)	Deviation (@-20dB)	
	（kHz）	（kHz）	（kHz）	（kHz）	（kHz）
300	0.603	0.025	0.603	0.030	2.5
400	0.604	0.135	0.606	0.155	2.5
500	0.909	0.173	0.901	0.160	2.5
600	1.062	0.185	1.058	0.192	2.5
700	1.188	0.220	1.186	0.202	2.5
800	1.417	0.240	1.414	0.227	2.5
900	1.622	0.331	1.624	0.320	2.5
1000	1.808	0.362	1.808	0.372	2.5
1200	1.937	0.339	1.937	0.331	2.5
1400	1.974	0.326	1.972	0.320	2.5
1600	1.990	0.441	1.995	0.451	2.5
1800	2.104	0.548	2.106	0.554	2.5
2000	2.208	0.619	2.209	0.611	2.5
2200	2.208	0.710	2.212	0.701	2.5
2400	1.817	0.849	1.811	0.841	2.5
2600	1.703	0.831	1.708	0.836	2.5
2800	1.605	0.870	1.609	0.863	2.5
3000	1.410	0.844	1.408	0.848	2.5
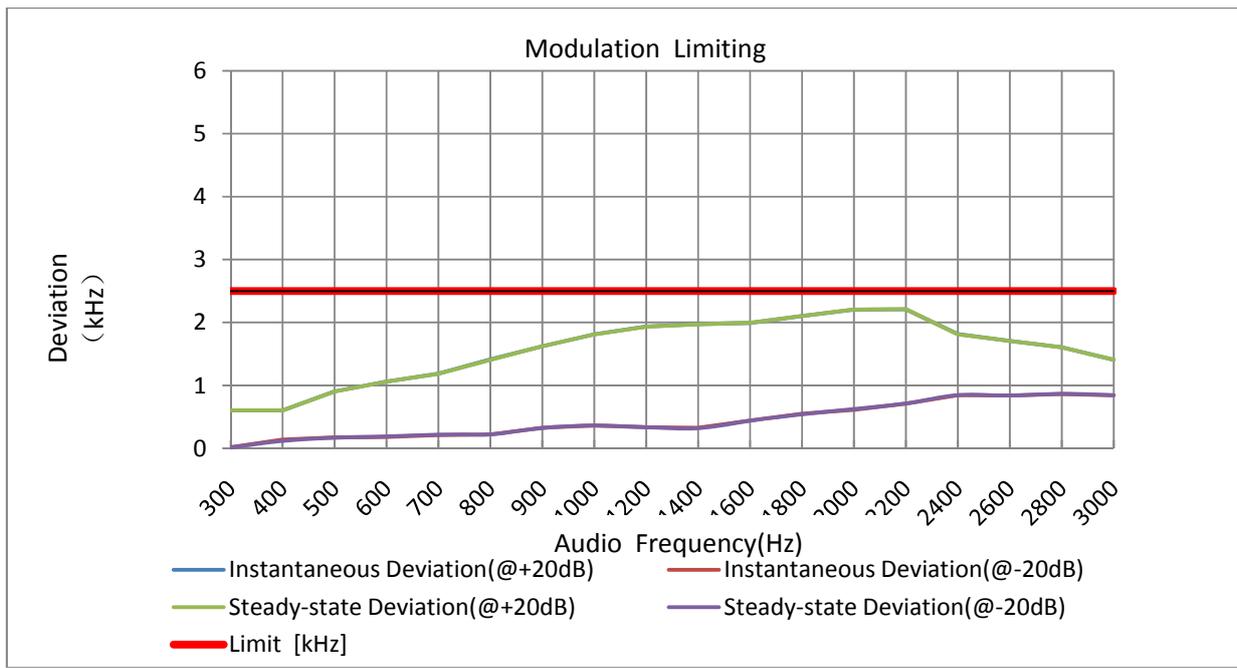
Audio Frequency Response
Carrier Frequency: 136.025MHz, Channel Spacing = 12.5 kHz

Audio Frequency	Response Attenuation
（Hz）	（dB）
300	-13.20
400	-9.06
500	-7.08
600	-4.82
700	-3.18
800	-2.48
900	-0.94
1000	0.00
1200	1.44
1400	2.63
1600	3.74
1800	4.41
2000	5.50
2200	5.34
2400	6.16
2600	6.33
2800	6.36
3000	6.43
3125	6.63
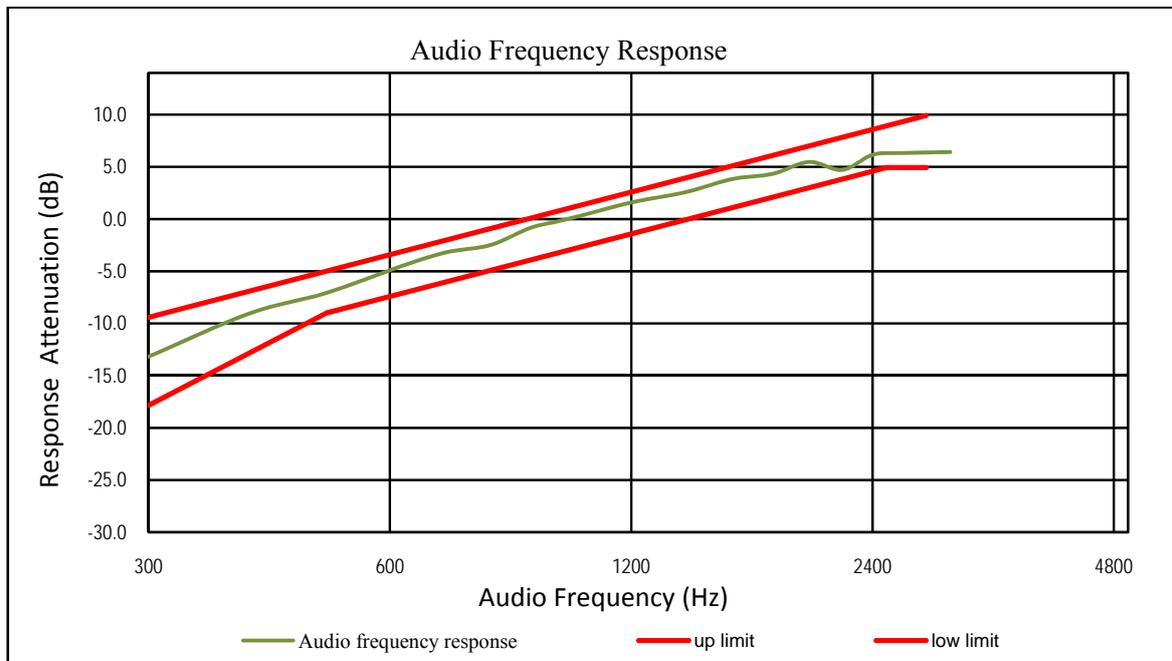
Audio Frequency Response

Audio Frequency Low Pass Filter Response
Carrier Frequency: 136.025 MHz，Channel Spacing = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation （dB）	Limit (dB)
3.0	-2.1	0
3.5	-8.2	-6.7
4.0	-14.7	-12.5
5.0	-26.7	-22.2
7.0	-38.9	-36.8
10.0	-54.4	-52.3
15.0	-71.3	-69.9
20.0	-83.9	-82.5
30.0	-85.0	-82.5
50.0	-85.7	-82.5
70.0	-86.3	-82.5
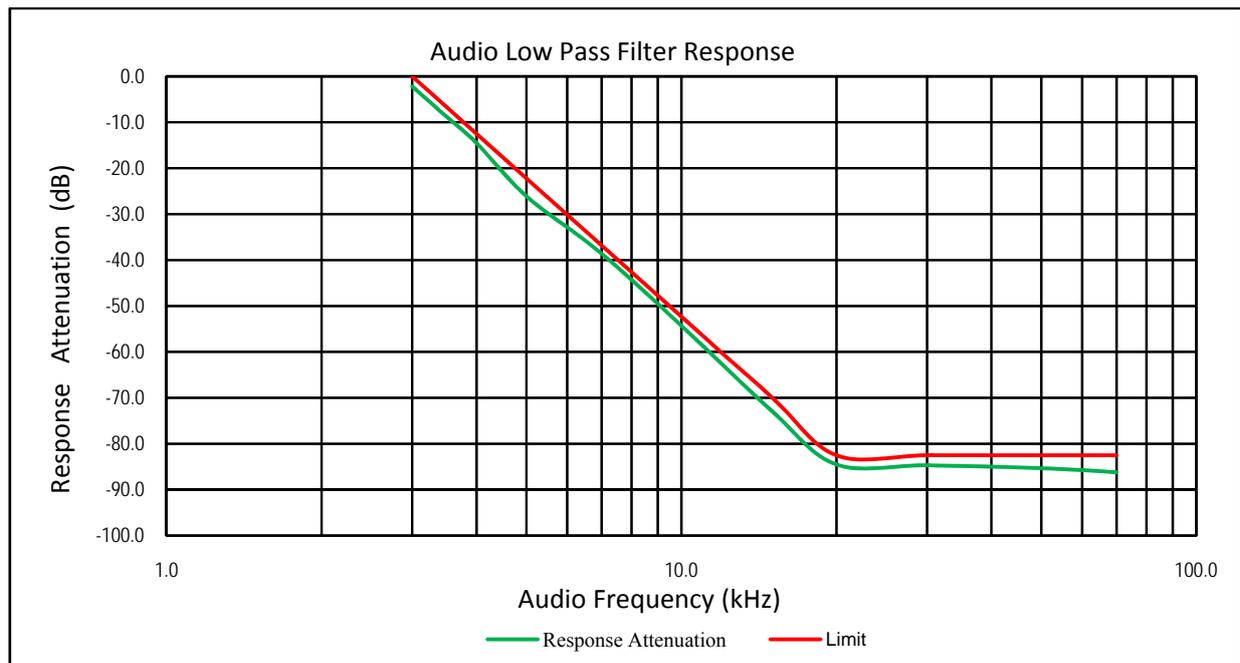
Audio Low Pass Filter Response

MODULATION LIMITING

Carrier Frequency: 155.000 MHz, Channel Spacing = 12.5 kHz

Audio Frequency (Hz)	Instantaneous		steady-state		Limit
	Deviation (@+20dB)	Deviation (@-20dB)	Deviation (@+20dB)	Deviation (@-20dB)	
	（kHz）	（kHz）	（kHz）	（kHz）	（kHz）
300	0.604	0.031	0.603	0.019	2.5
400	0.604	0.129	0.607	0.128	2.5
500	0.906	0.162	0.903	0.169	2.5
600	1.061	0.192	1.063	0.187	2.5
700	1.184	0.217	1.185	0.210	2.5
800	1.408	0.234	1.403	0.230	2.5
900	1.623	0.338	1.625	0.339	2.5
1000	1.811	0.361	1.810	0.363	2.5
1200	1.935	0.330	1.934	0.338	2.5
1400	1.976	0.321	1.972	0.324	2.5
1600	1.992	0.445	1.991	0.451	2.5
1800	2.101	0.544	2.105	0.554	2.5
2000	2.205	0.617	2.203	0.620	2.5
2200	2.209	0.704	2.208	0.716	2.5
2400	1.811	0.845	1.816	0.847	2.5
2600	1.705	0.830	1.704	0.832	2.5
2800	1.608	0.865	1.608	0.861	2.5
3000	1.405	0.844	1.406	0.849	2.5
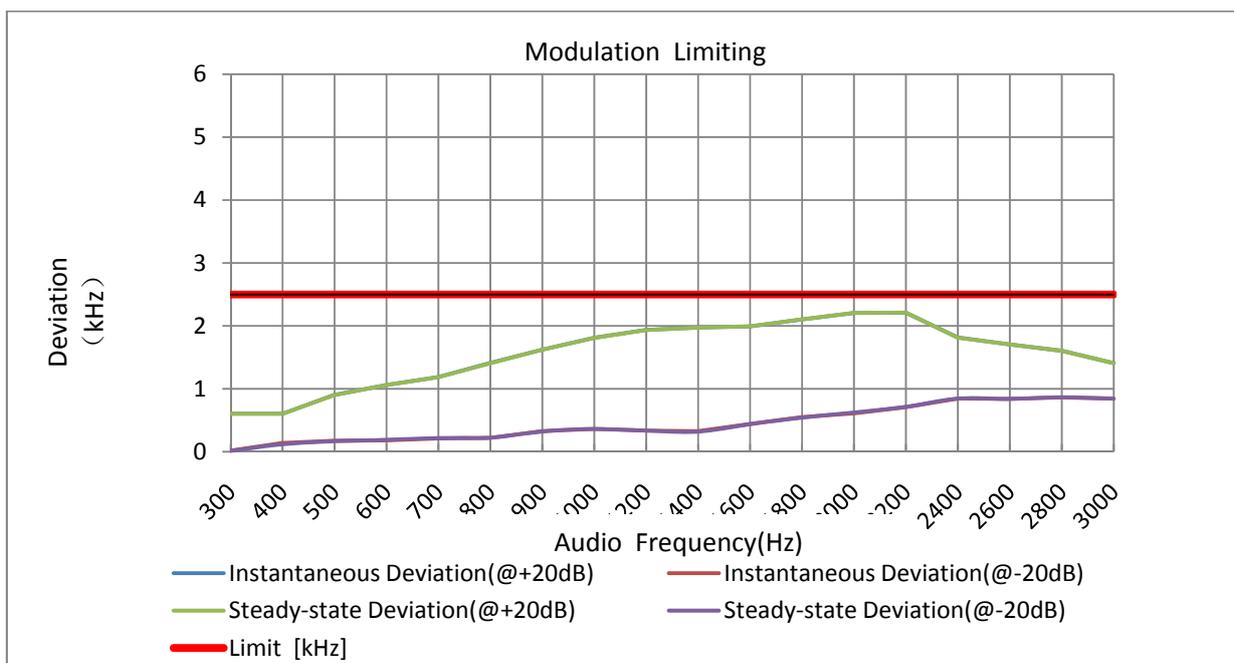
Audio Frequency Response
Carrier Frequency:155.000 MHz, Channel Spacing = 12.5 kHz

Audio Frequency	Response Attenuation
（Hz）	（dB）
300	-13.17
400	-9.10
500	-7.09
600	-4.88
700	-3.25
800	-2.46
900	-0.89
1000	0.00
1200	1.51
1400	2.64
1600	3.84
1800	4.47
2000	5.60
2200	4.89
2400	6.24
2600	6.33
2800	6.37
3000	6.41
3125	6.58
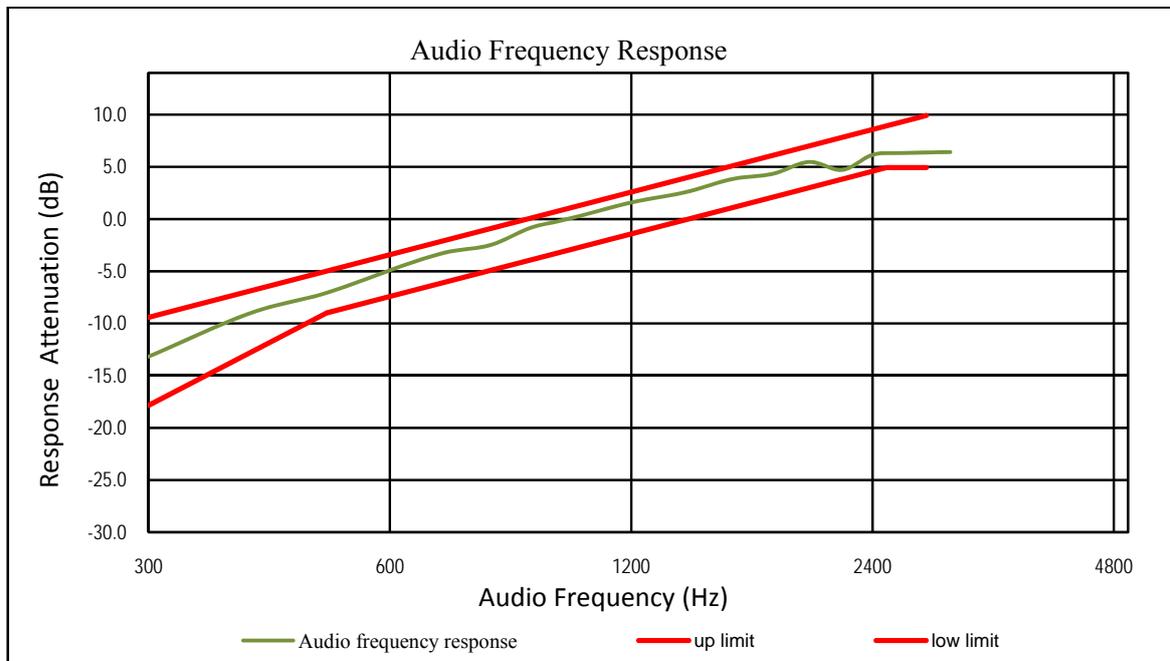
Audio Frequency Response

Audio Frequency Low Pass Filter Response
Carrier Frequency: 155.000 MHz，Channel Spacing = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation （dB）	Limit (dB)
3.0	-2.3	0
3.5	-8.8	-6.7
4.0	-16.3	-12.5
5.0	-26.1	-22.2
7.0	-38.7	-36.8
10.0	-55.0	-52.3
15.0	-73.9	-69.9
20.0	-83.7	-82.5
30.0	-84.9	-82.5
50.0	-85.9	-82.5
70.0	-86.8	-82.5
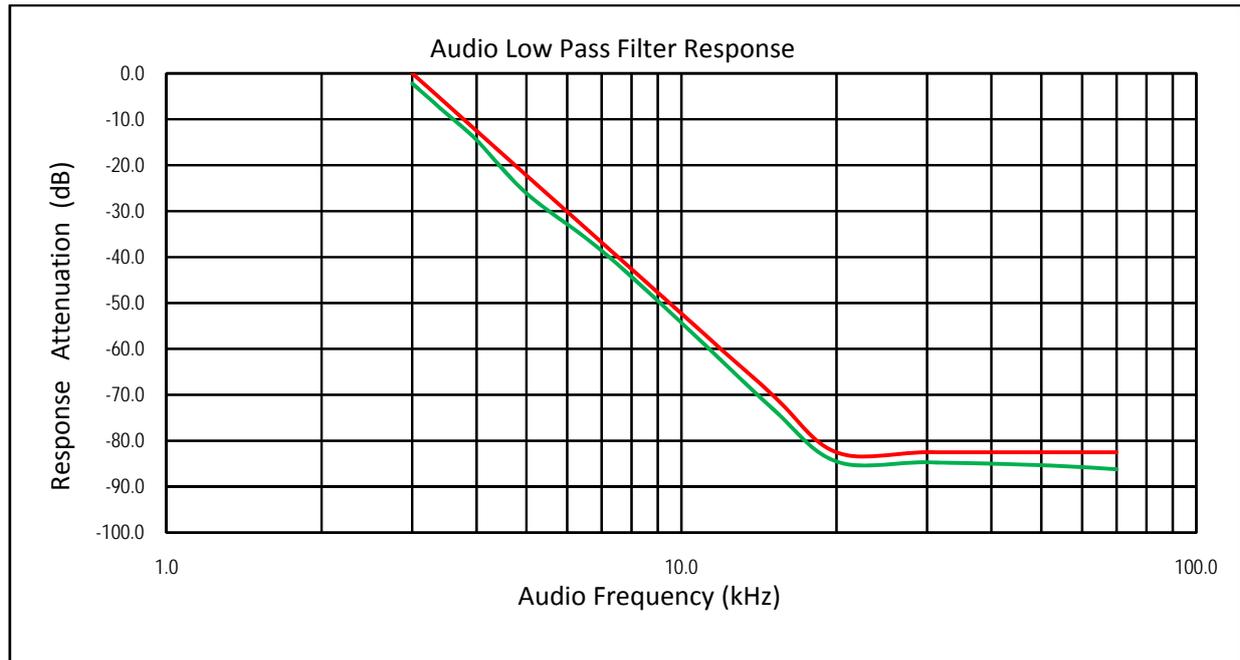
Audio Low Pass Filter Response

MODULATION LIMITING

Carrier Frequency: 173.975 MHz, Channel Spacing = 12.5 kHz

Audio Frequency (Hz)	Instantaneous		steady-state		Limit
	Deviation (@+20dB)	Deviation (@-20dB)	Deviation (@+20dB)	Deviation (@-20dB)	
	（kHz）	（kHz）	（kHz）	（kHz）	（kHz）
300	0.603	0.020	0.603	0.015	2.5
400	0.603	0.140	0.604	0.120	2.5
500	0.905	0.174	0.902	0.169	2.5
600	1.060	0.183	1.060	0.189	2.5
700	1.188	0.213	1.185	0.220	2.5
800	1.413	0.221	1.404	0.223	2.5
900	1.623	0.328	1.623	0.324	2.5
1000	1.812	0.364	1.810	0.362	2.5
1200	1.935	0.335	1.933	0.337	2.5
1400	1.976	0.327	1.972	0.320	2.5
1600	1.993	0.441	1.995	0.440	2.5
1800	2.104	0.551	2.103	0.542	2.5
2000	2.206	0.611	2.207	0.625	2.5
2200	2.210	0.710	2.212	0.713	2.5
2400	1.818	0.845	1.811	0.845	2.5
2600	1.707	0.839	1.706	0.839	2.5
2800	1.606	0.862	1.604	0.866	2.5
3000	1.408	0.842	1.408	0.845	2.5
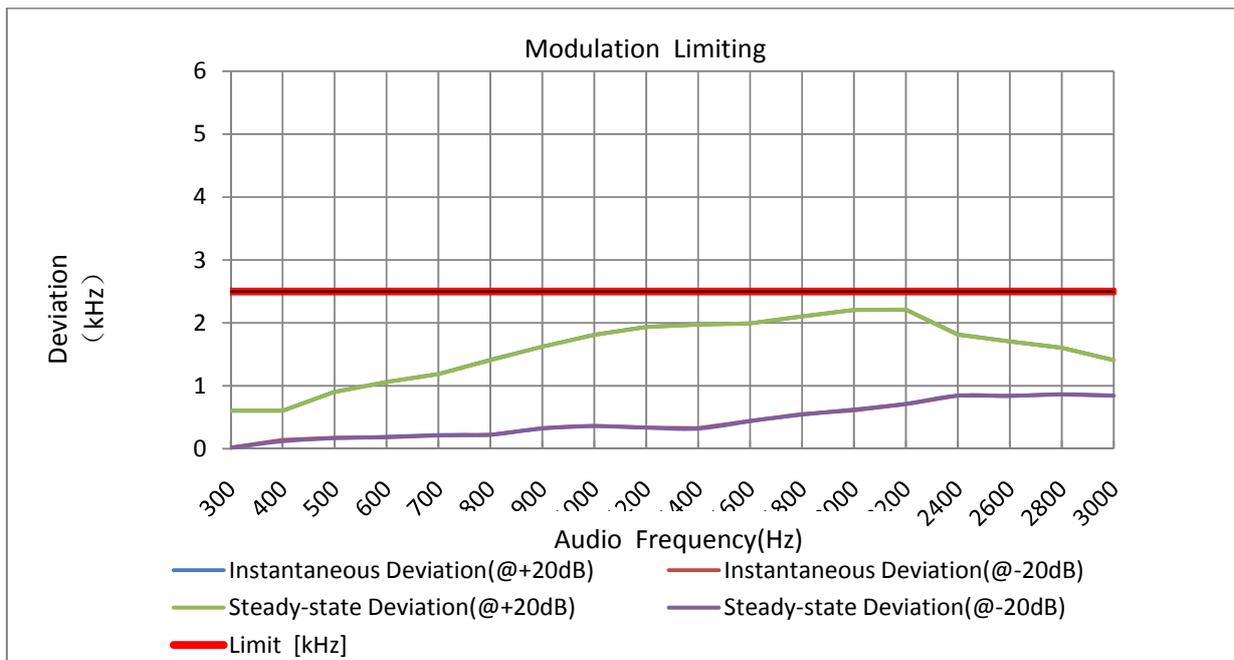
Audio Frequency Response
Carrier Frequency: 173.975 MHz, Channel Spacing = 12.5 kHz

Audio Frequency	Response Attenuation
（Hz）	（dB）
300	-13.18
400	-9.07
500	-7.08
600	-4.90
700	-3.24
800	-2.50
900	-0.82
1000	0.00
1200	1.59
1400	2.56
1600	3.82
1800	4.33
2000	5.47
2200	4.71
2400	6.16
2600	6.32
2800	6.38
3000	6.42
3125	6.63
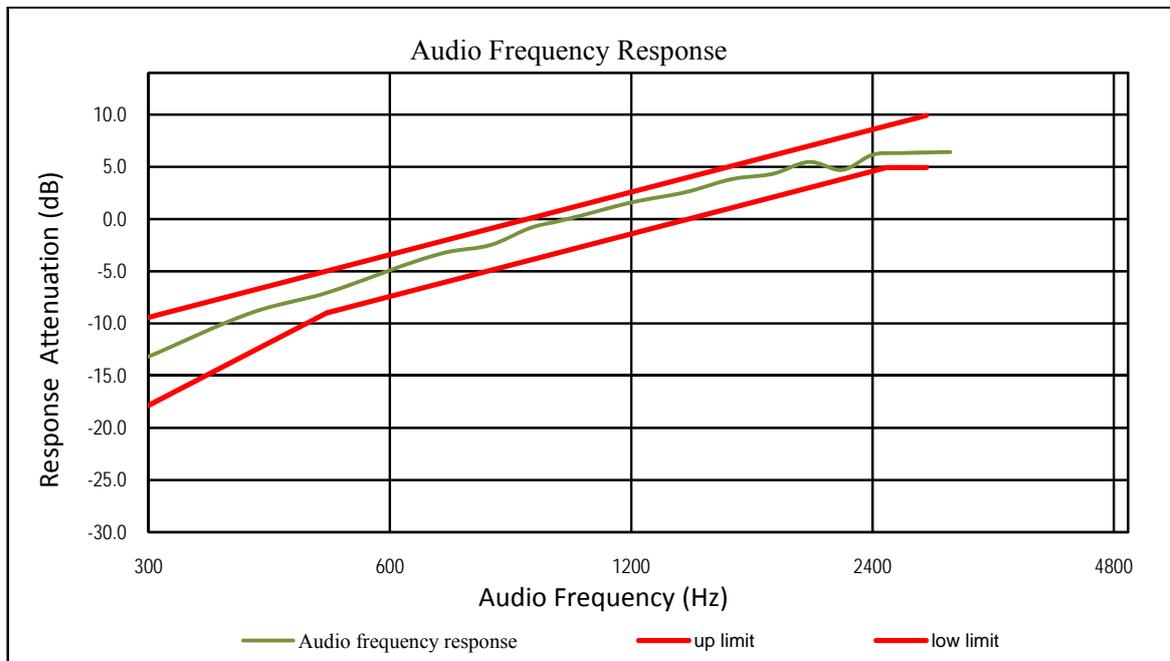
Audio Frequency Response

Audio Frequency Low Pass Filter Response
Carrier Frequency: 173.975 MHz，Channel Spacing = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation （dB）	Limit (dB)
3.0	-2.2	0
3.5	-8.8	-6.7
4.0	-14.5	-12.5
5.0	-26.1	-22.2
7.0	-38.6	-36.8
10.0	-54.3	-52.3
15.0	-71.9	-69.9
20.0	-83.5	-82.5
30.0	-84.7	-82.5
50.0	-85.3	-82.5
70.0	-86.2	-82.5
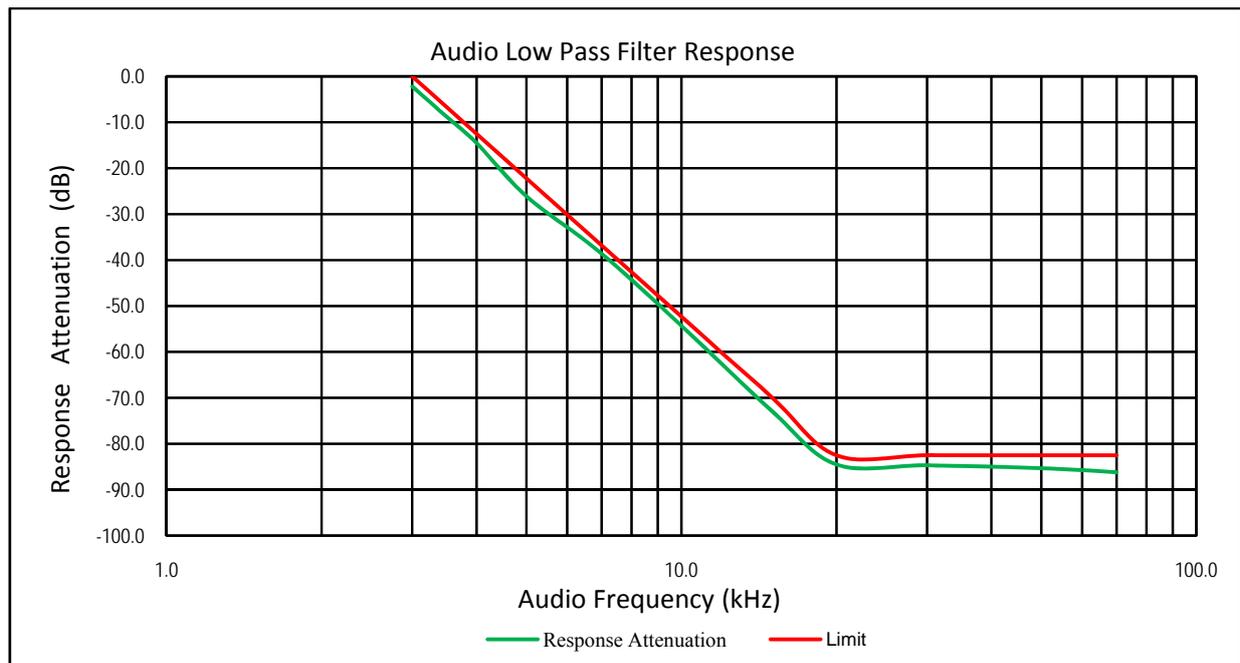
FCC §2.1049 & § 90.209 § 90.210– OCCUPIED BANDWIDTH &EMISSION MASK

Applicable Standard

FCC §2.1049, § 90.209 and § 90.210

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.

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 100Hz and the spectrum was recorded in the frenquency band.

Test Data

Environmental Conditions

Temperature:	24.9 ℃
Relative Humidity:	52%
ATM Pressure:	101.7 kPa

The testing was performed by Stone Zhang on 2021-06-21.

Test Mode: Transmitting

Test Result: Compliant.

UHF:

Modulation Mode	ChannelSpacing(kHz)	fc (MHz)	Power level	99% Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)
FM	12.5 kHz	400.025	High	7.525	10.275
			Low	7.598	10.347
		440.000	High	7.308	10.275
			Low	7.525	10.275
		479.975	High	7.453	10.275
			Low	7.525	10.347
4FSK	12.5 kHz	400.025	High	7.887	10.130
			Low	8.032	10.347
		440.000	High	8.032	10.203
			Low	8.032	10.130
		479.975	High	8.177	10.637
			Low	8.032	10.058

Note：Emssion Designator is base on calculation instead of measurement

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 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.

High Power, Occupied Bandwidth-400.025 MHz (FM 12.5kHz)

Spectrum						
Ref Level 50.00 dBm	Offset 31.50 dB	RBW 100 Hz				
Att 30 dB	SWT 19 ms	VBW 300 Hz	Mode Auto FFT			

- 1Pk Max

D1[1]   -2.19 dB
                    10.2750 kHz
Occ Bw   7.525325615 kHz
M1[1]   6.58 dBm
                  400.0205860 MHz

D1 38.300 dBm

D2 12.300 dBm

CF 400.025 MHz   691 pts   Span 50.0 kHz

Date: 21.JUN.2021 12:59:41

Emission Mask D

Spectrum						
Ref Level 50.00 dBm	Offset 31.50 dB	RBW 100 Hz				
Att 30 dB	SWT 19 ms	VBW 1 kHz	Mode Auto FFT			

- 1Pk Max

Limit Check   PASS   M1[1]   38.35 dBm
Line MASK   PASS   400.0257240 MHz

MASK

CF 400.025 MHz   691 pts   Span 50.0 kHz
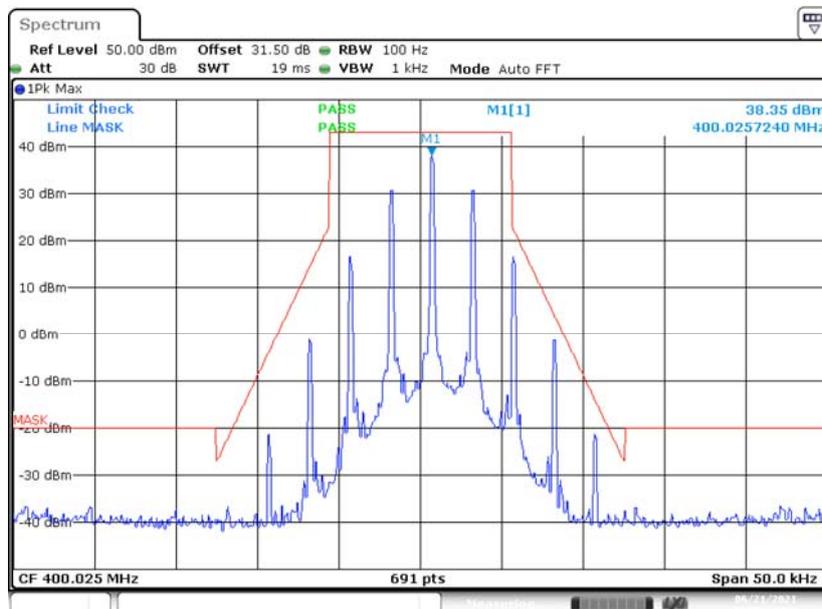
Date: 21.JUN.2021 12:58:01

Low Power, Occupied Bandwidth-400.025 MHz (FM 12.5kHz)
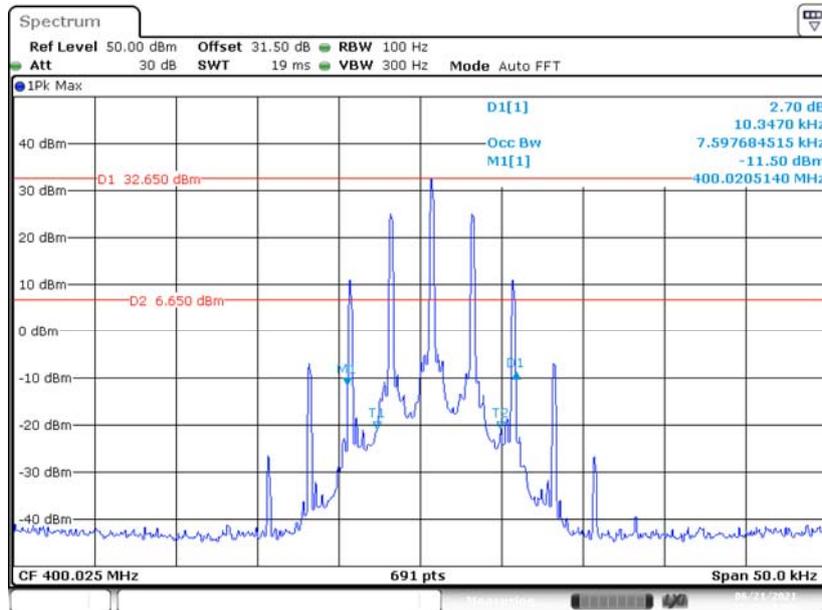
Date: 21.JUN.2021 12:33:46

Emission Mask D
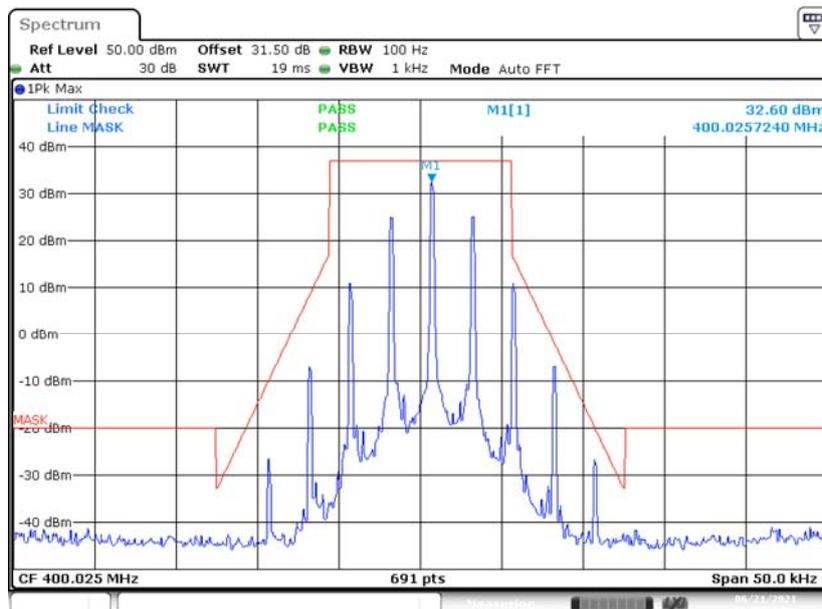
Date: 21.JUN.2021 12:36:51

High Power, Occupied Bandwidth-440.000 MHz (FM 12.5kHz)
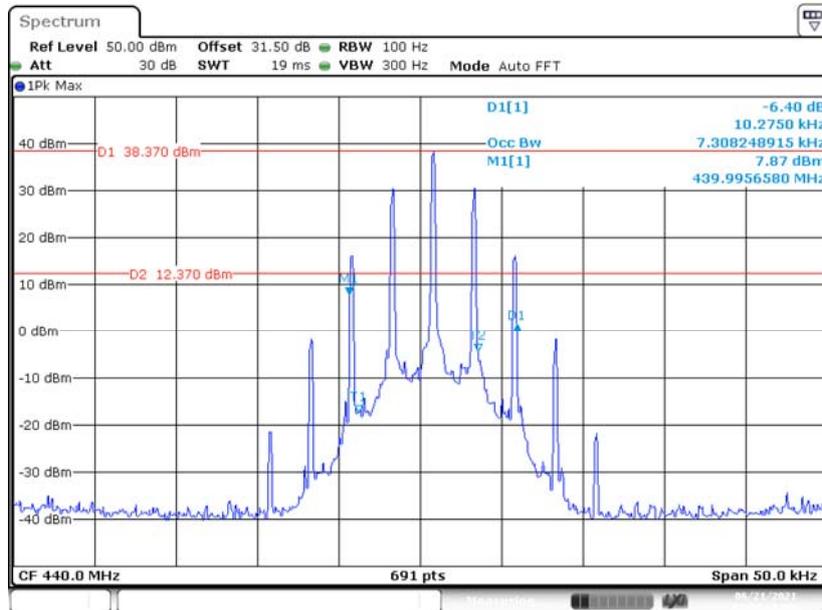
Date: 21.JUN.2021 13:04:17

Emission Mask D
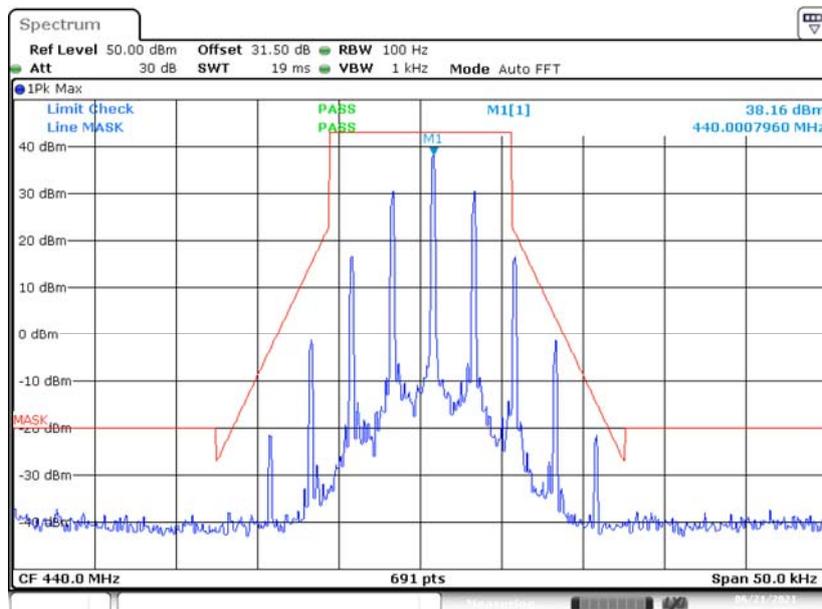
Date: 21.JUN.2021 12:57:31

Low Power, Occupied Bandwidth-440.000 MHz (FM 12.5kHz)
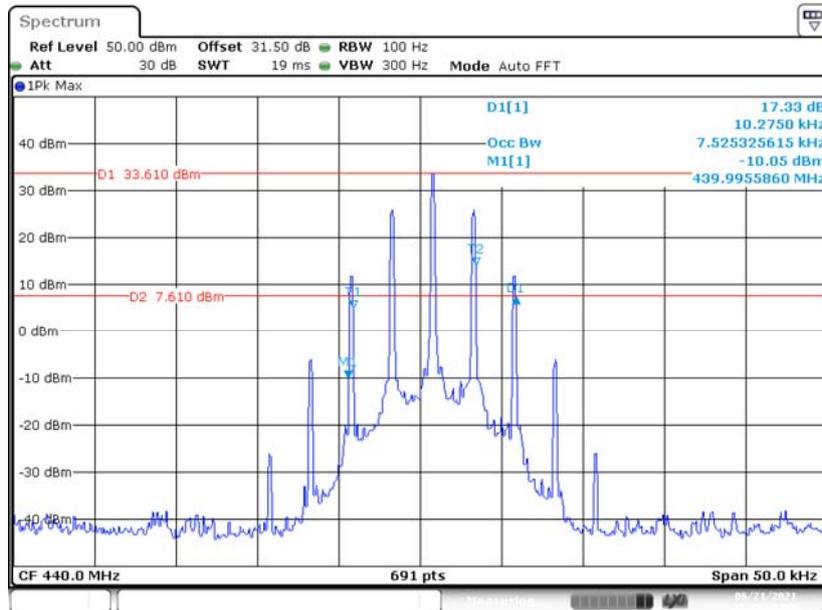

Date: 21.JUN.2021 12:32:15

Emission Mask D
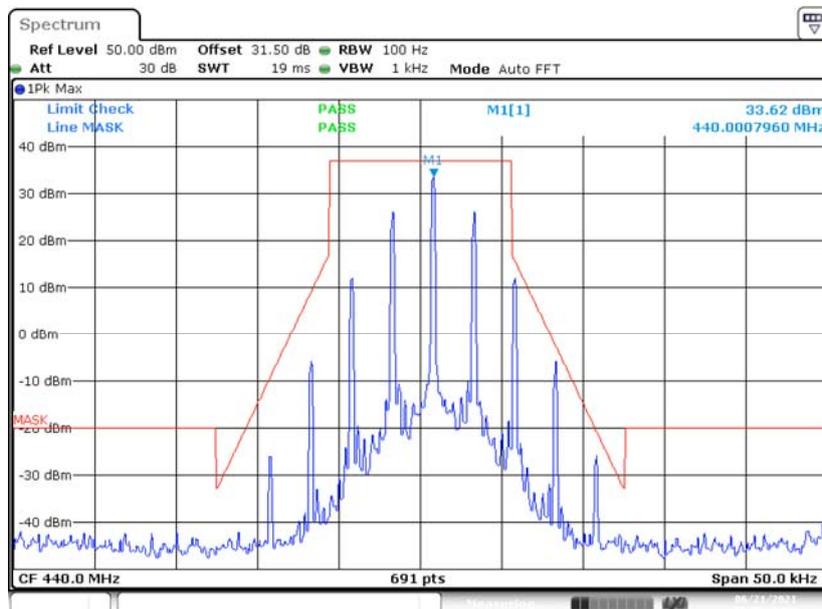
Date: 21.JUN.2021 12:38:18

High Power, Occupied Bandwidth-479.975 MHz (FM 12.5kHz)
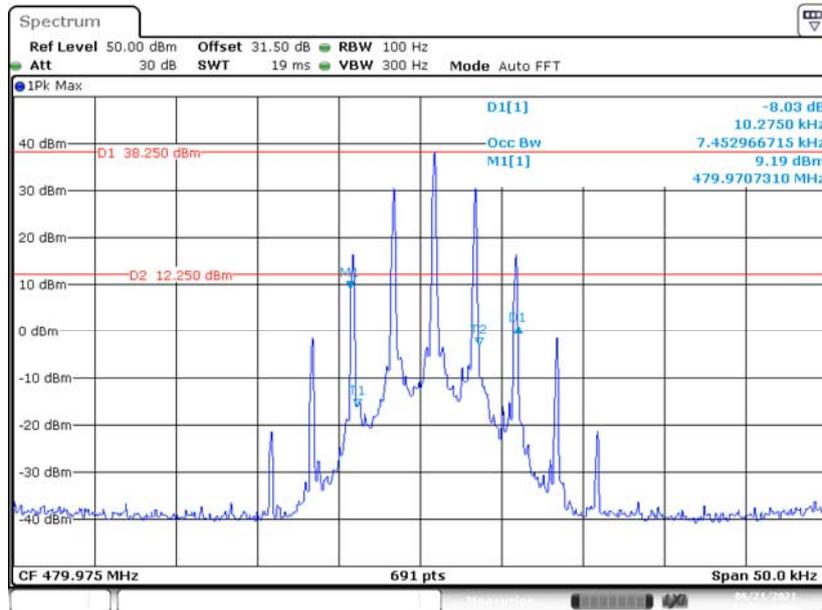
Date: 21.JUN.2021 13:05:49

Emission Mask D
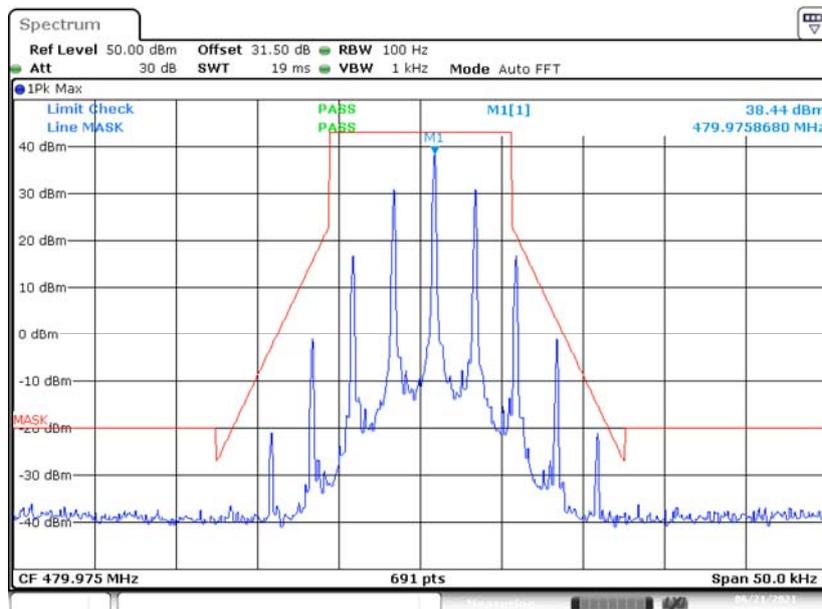
Date: 21.JUN.2021 12:57:03

Low Power, Occupied Bandwidth-479.975MHz (FM 12.5kHz)
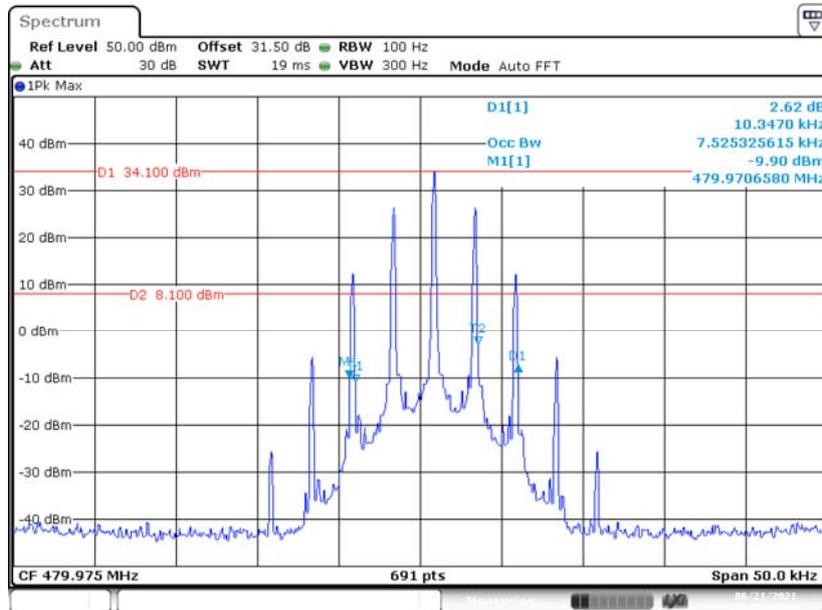
Date: 21.JUN.2021 12:30:04

Emission Mask D
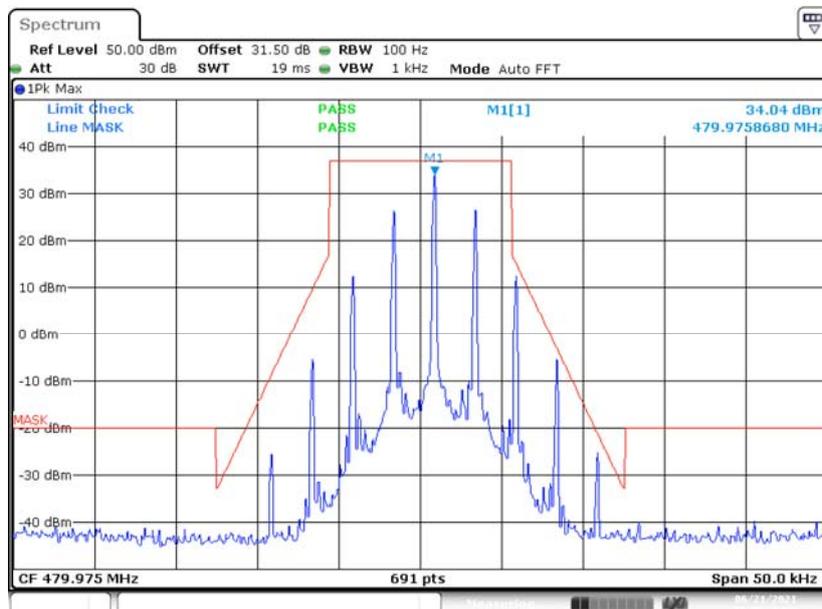
Date: 21.JUN.2021 12:38:46

High Power, Occupied Bandwidth-400.025 MHz (4FSK 12.5kHz)
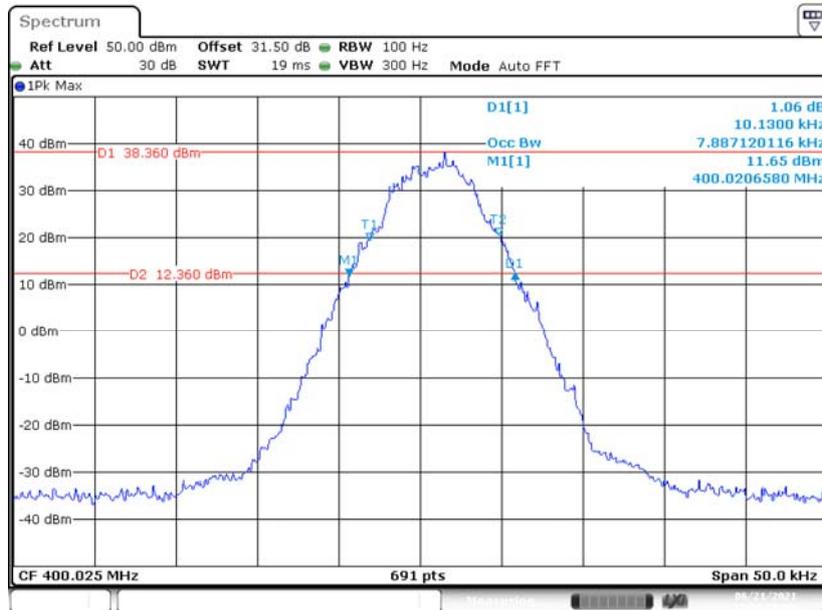
Date: 21.JUN.2021 12:04:21

Emission Mask D
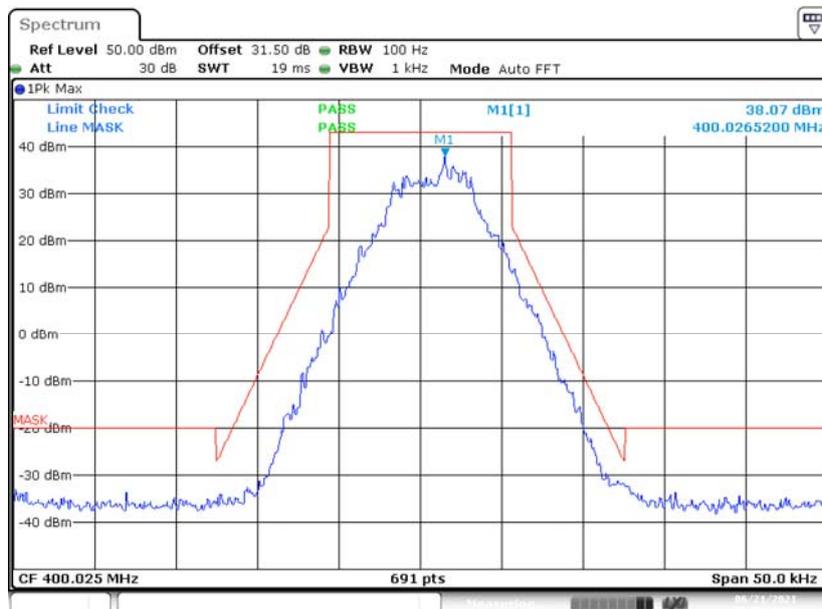
Date: 21.JUN.2021 12:48:02

Low Power, Occupied Bandwidth-400.025 MHz (4FSK 12.5kHz)
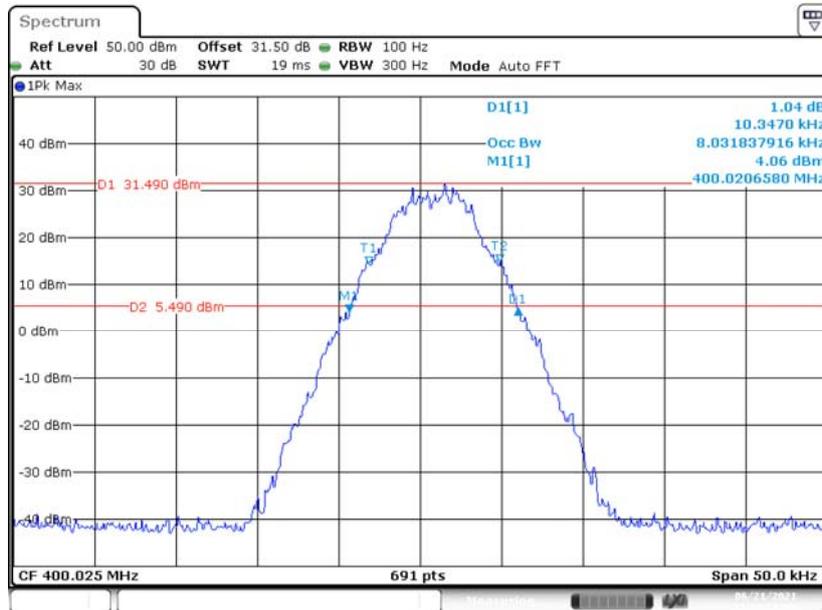
Date: 21.JUN.2021 12:14:22

Emission Mask D
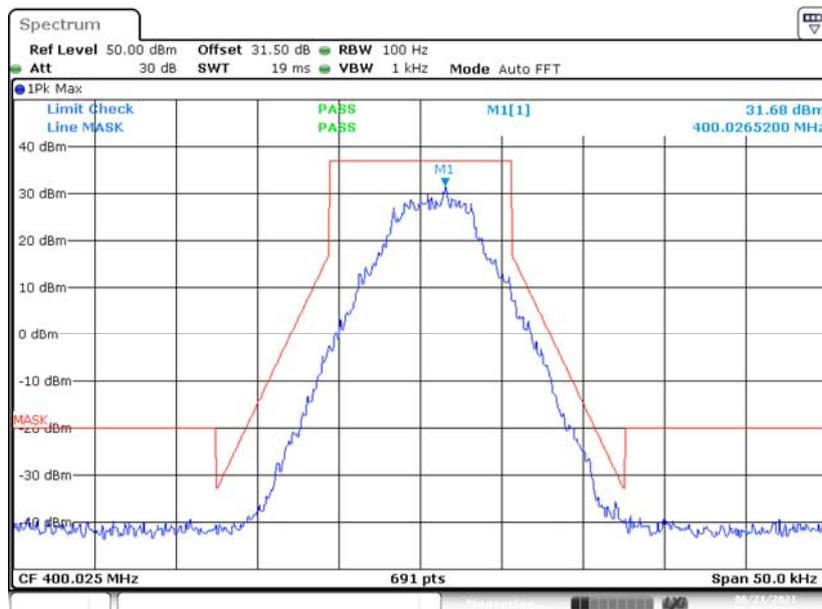
Date: 21.JUN.2021 12:44:35

High Power, Occupied Bandwidth-440.000 MHz (4FSK 12.5kHz)
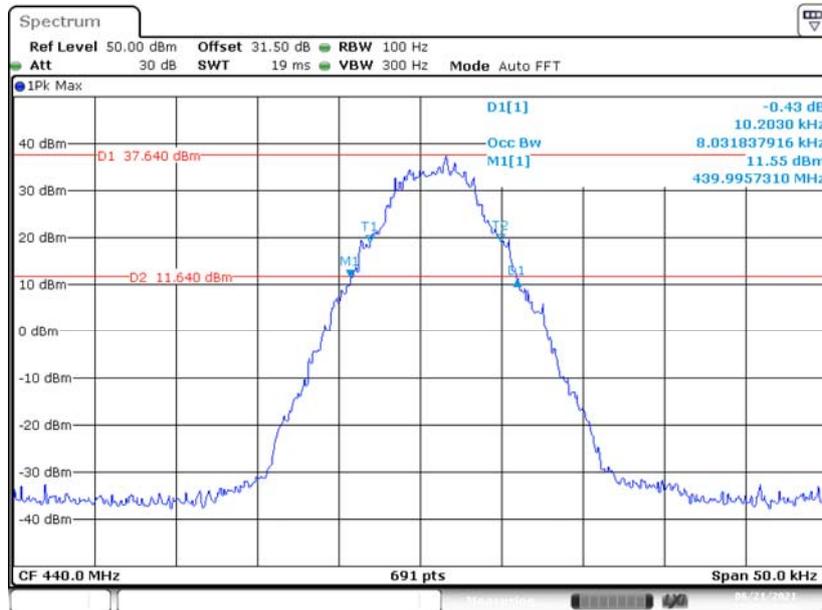
Date: 21.JUN.2021 12:06:00

Emission Mask D
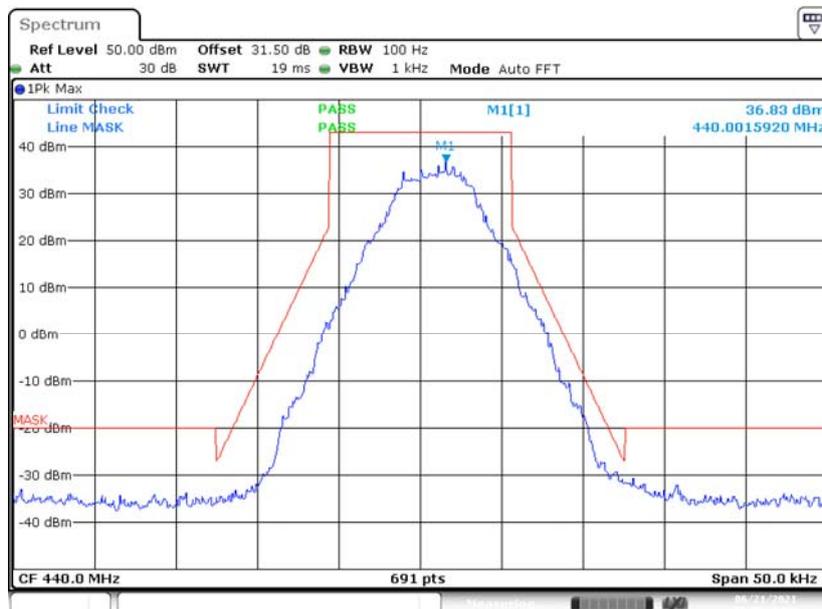
Date: 21.JUN.2021 12:48:48

Low Power, Occupied Bandwidth-440.000 MHz (4FSK 12.5kHz)
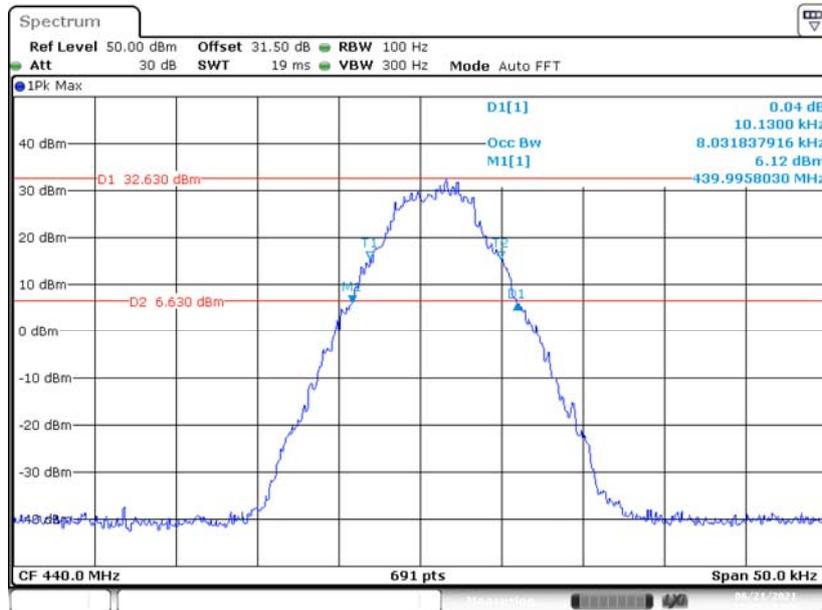
Date: 21.JUN.2021 12:09:49

Emission Mask D
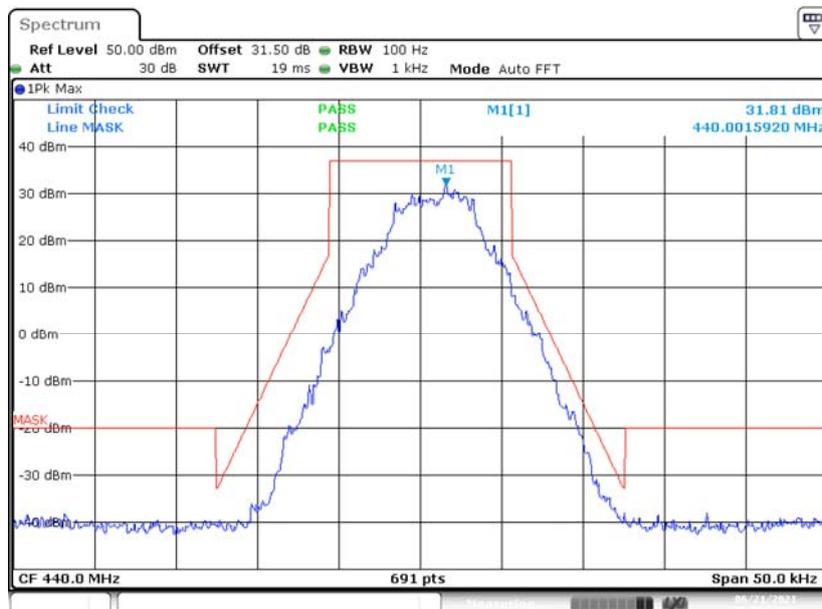
Date: 21.JUN.2021 12:44:05

High Power, Occupied Bandwidth-479.975 MHz (4FSK 12.5kHz)
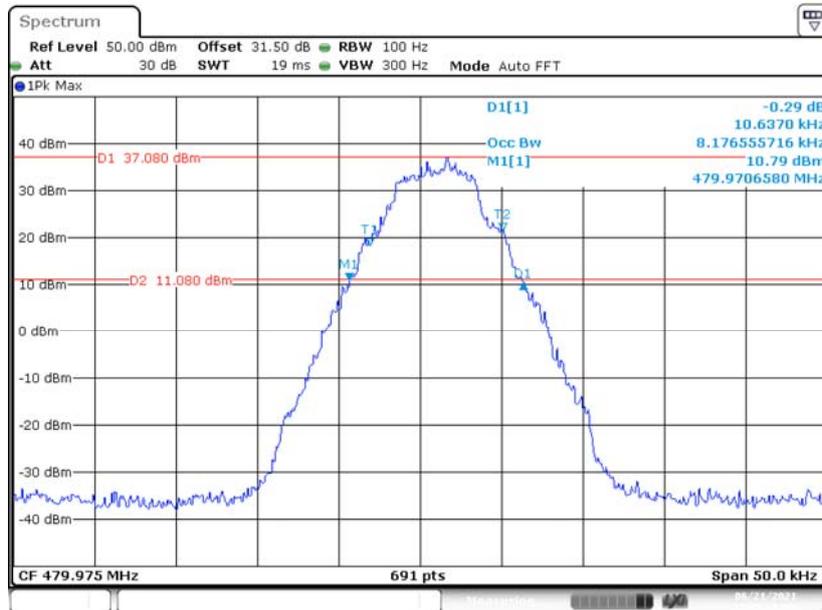
Date: 21.JUN.2021 12:07:25

Emission Mask D
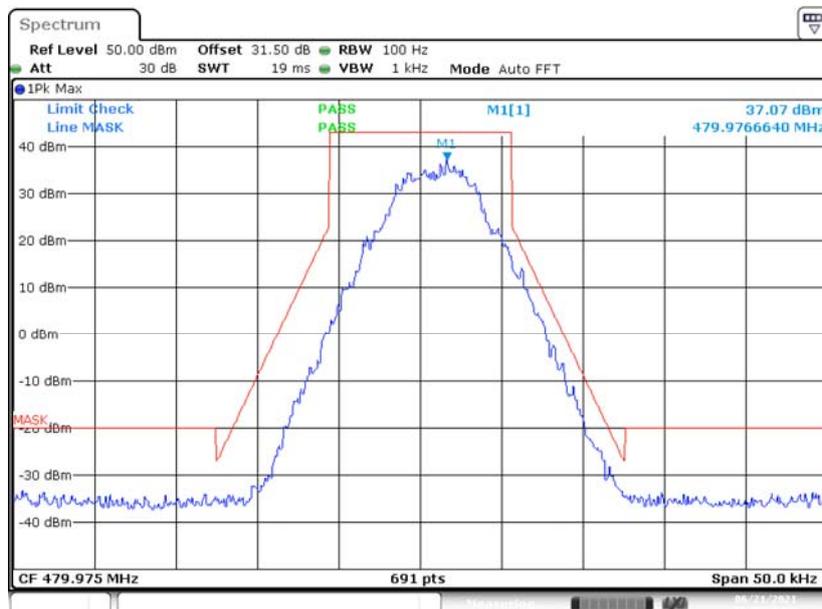
Date: 21.JUN.2021 12:49:55

Low Power, Occupied Bandwidth-479.975MHz (4FSK 12.5kHz)
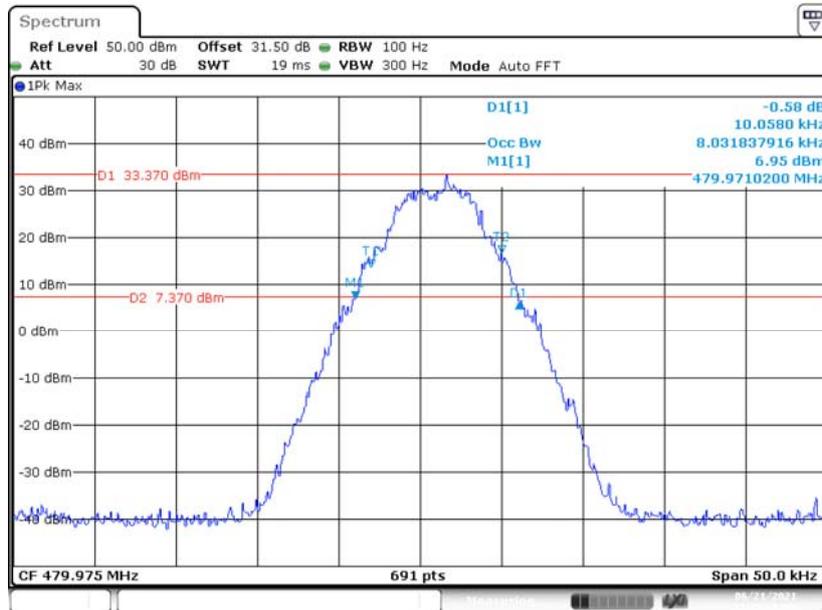
Date: 21.JUN.2021 12:12:25

Emission Mask D
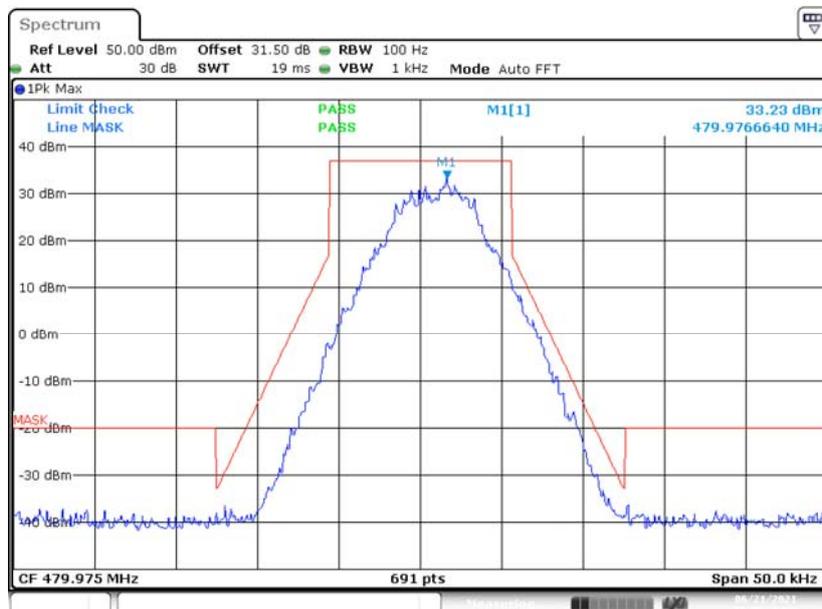
Date: 21.JUN.2021 12:43:16

VHF:

Modulation Mode	Channel Spacing (kHz)	fc (MHz)	Power level	99% Bandwidth (kHz)	26 Occupied Bandwidth (kHz)
FM	12.5 kHz	136.025	High	7.815	10.275
			Low	7.670	10.275
		155.000	High	7.308	10.275
			Low	7.742	10.275
		173.975	High	7.525	10.203
			Low	7.742	10.203
4FSK	12.5 kHz	136.025	High	7.381	9.624
			Low	7.525	9.768
		155.000	High	7.598	9.841
			Low	7.453	9.624
		173.975	High	7.525	9.696
			Low	7.598	9.841

For FM Mode (Channel Spacing: 12.5 kHz)
1. The occupied bandwidth shall not exceed the authorized bandwidth
2. Emssion Designator is base on calculation instead of measurement
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 Digital Mode (Channel Spacing: 12.5 kHz)
1. The occupied bandwidth shall not exceed the authorized bandwidth
2. Emssion Designator is base on calculation instead of measurement
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.

**High Power, Occupied Bandwidth-136.025 MHz (FM 12.5kHz)**


Date: 21.JUN.2021 15:09:37

Emission Mask D
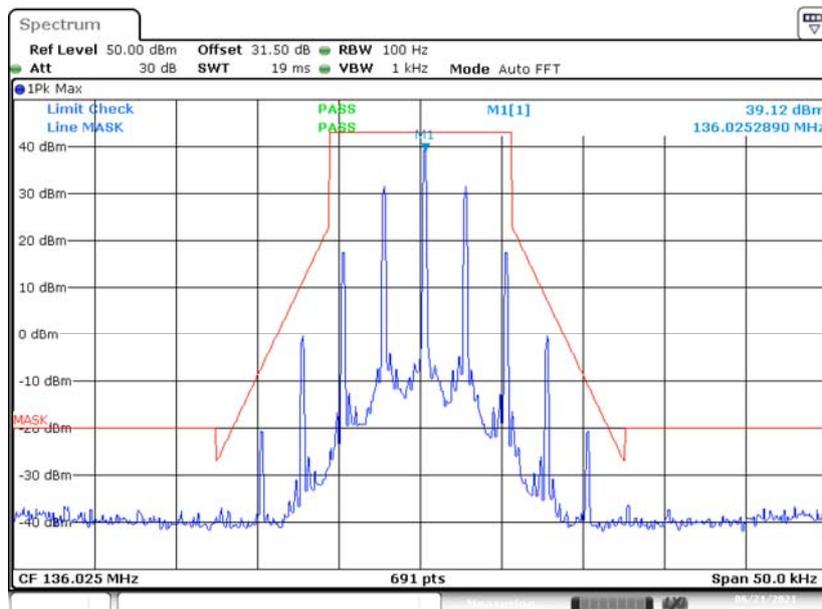
Date: 21.JUN.2021 15:41:28

Low Power, Occupied Bandwidth-136.025 MHz (FM 12.5kHz)
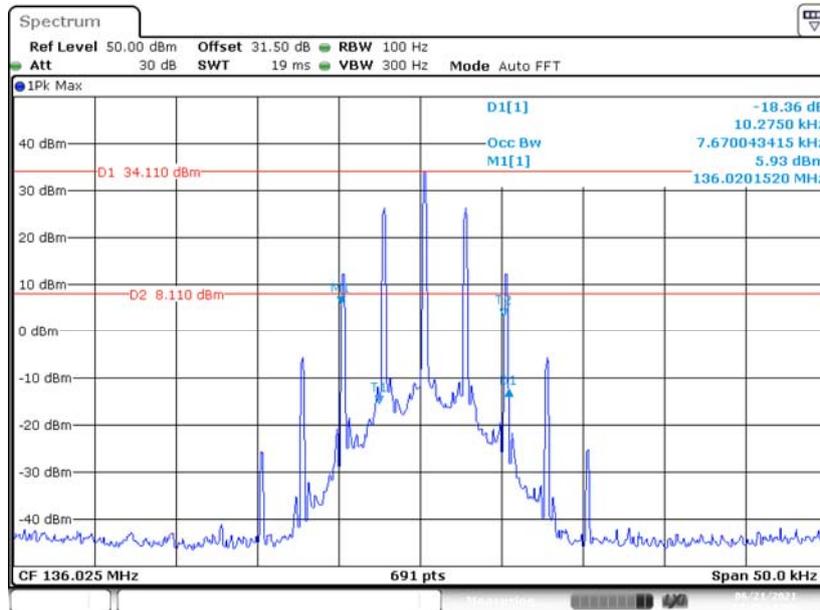

Date: 21.JUN.2021 15:18:14

Emission Mask D
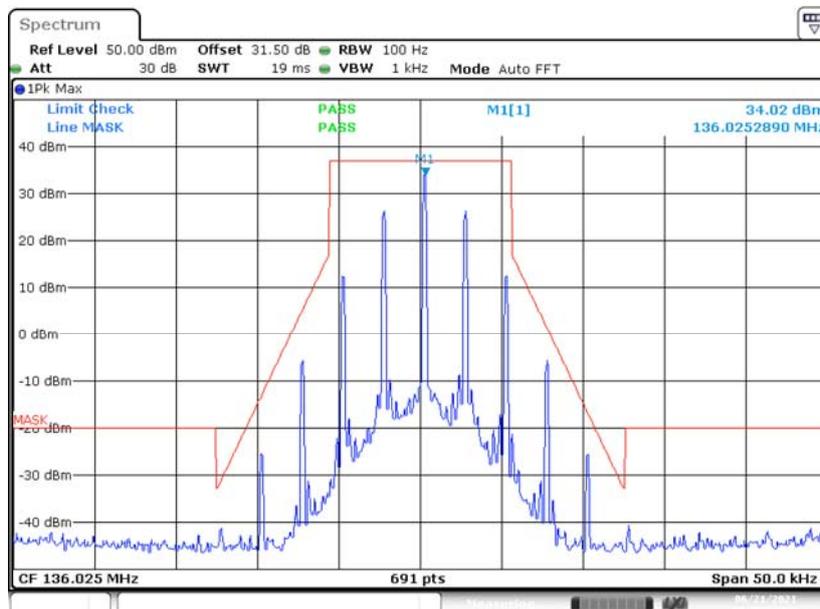
Date: 21.JUN.2021 15:38:24

**High Power, Occupied Bandwidth-155.000 MHz (FM 12.5kHz)**
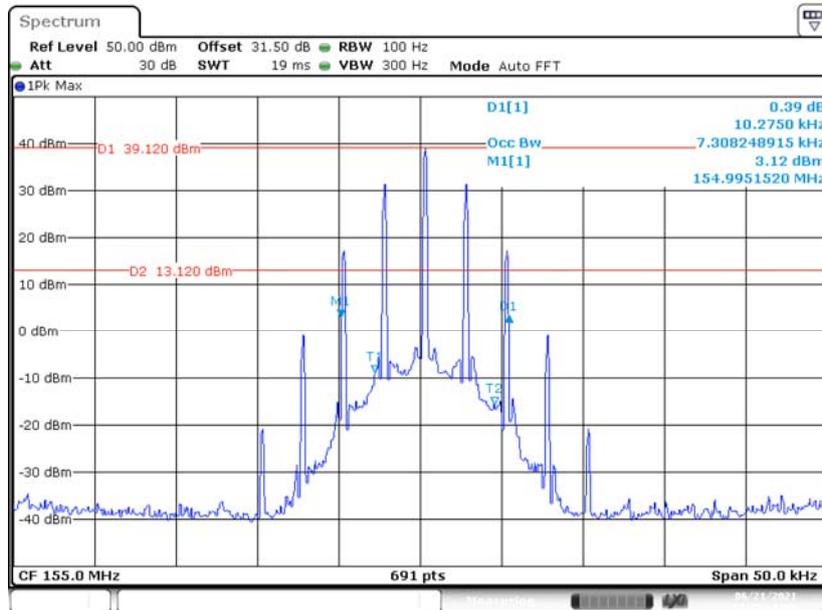

Date: 21.JUN.2021 15:11:33

Emission Mask D
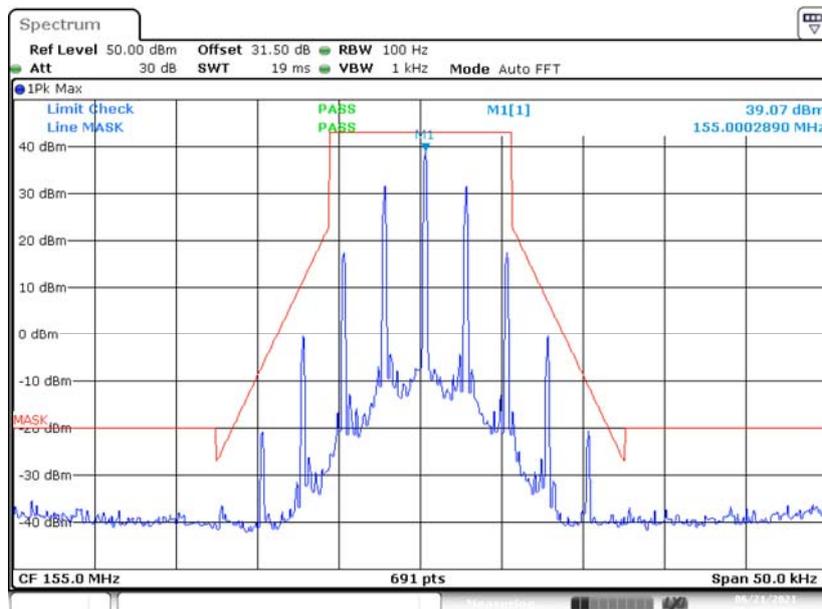
Date: 21.JUN.2021 15:41:04

Low Power, Occupied Bandwidth-155.000 MHz (FM 12.5kHz)
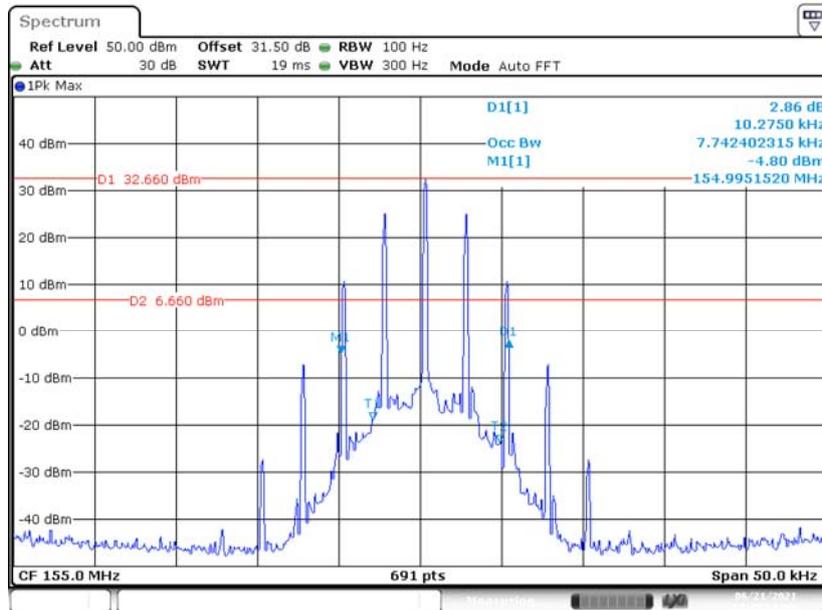
Date: 21.JUN.2021 15:19:52

Emission Mask D
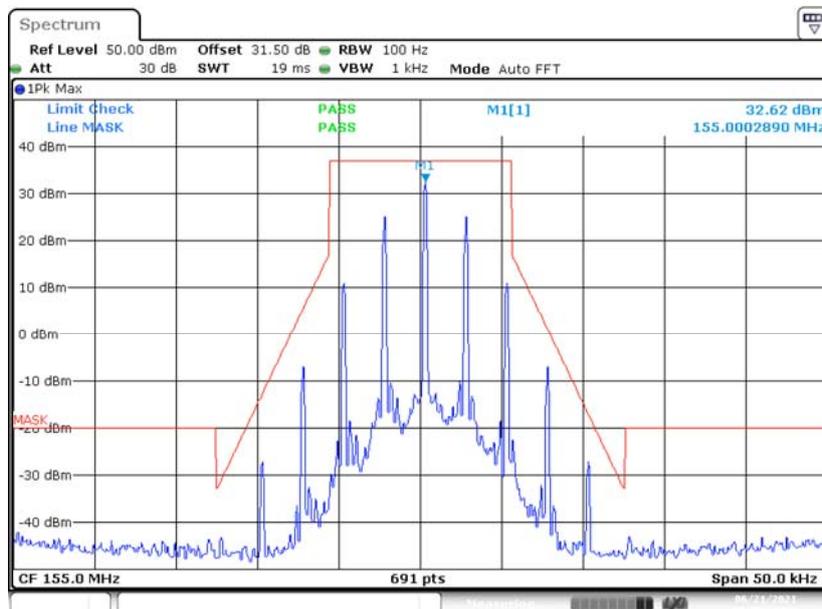
Date: 21.JUN.2021 15:39:07

High Power, Occupied Bandwidth-173.975 MHz (FM 12.5kHz)
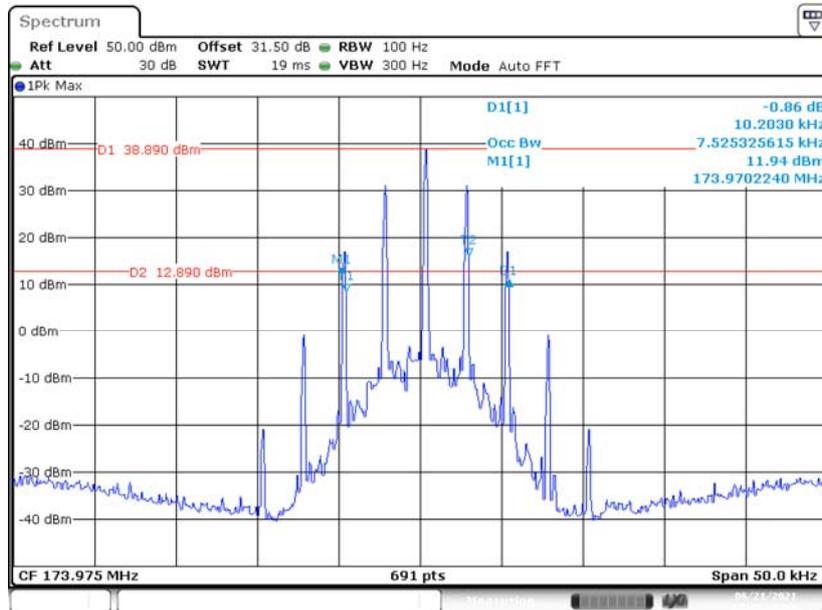
Date: 21.JUN.2021 15:16:18

**Emission Mask D**
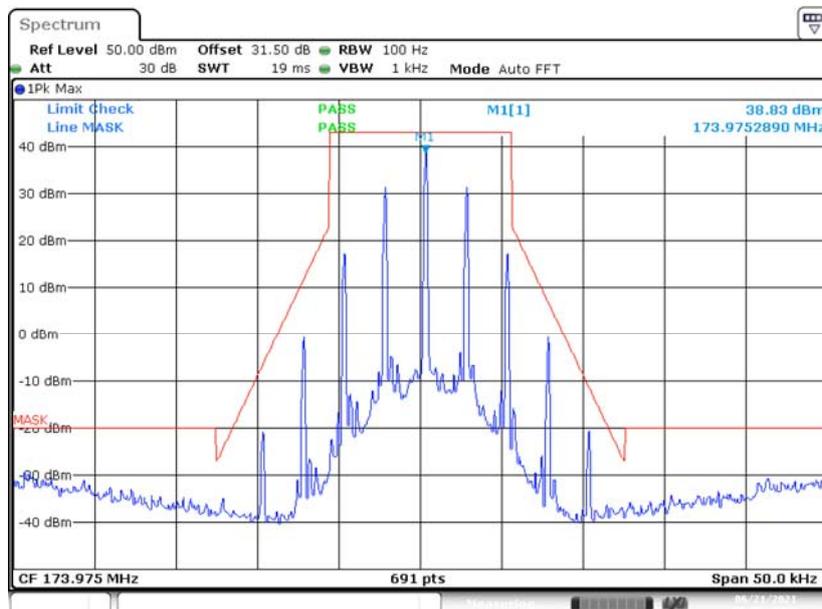
Date: 21.JUN.2021 15:40:37

Low Power, Occupied Bandwidth-173.975MHz (FM 12.5kHz)
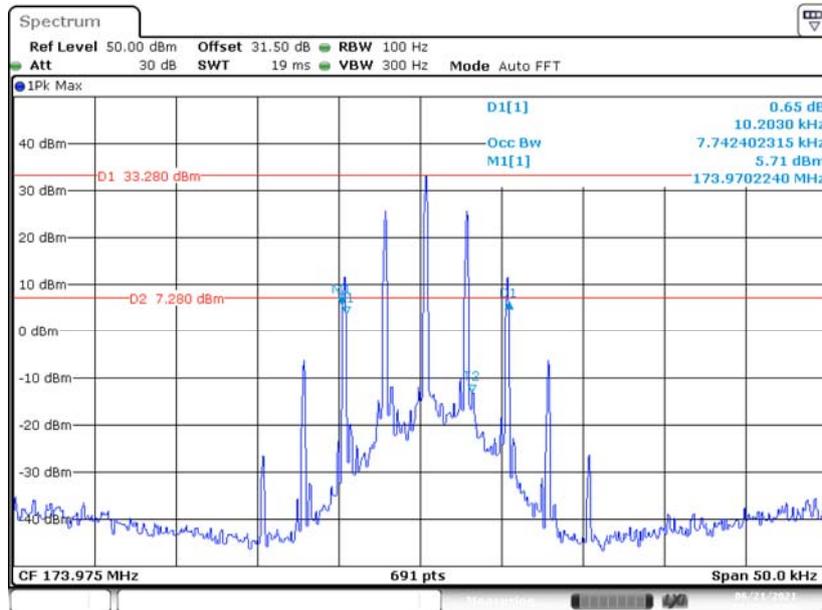

Date: 21.JUN.2021 15:24:35

Emission Mask D
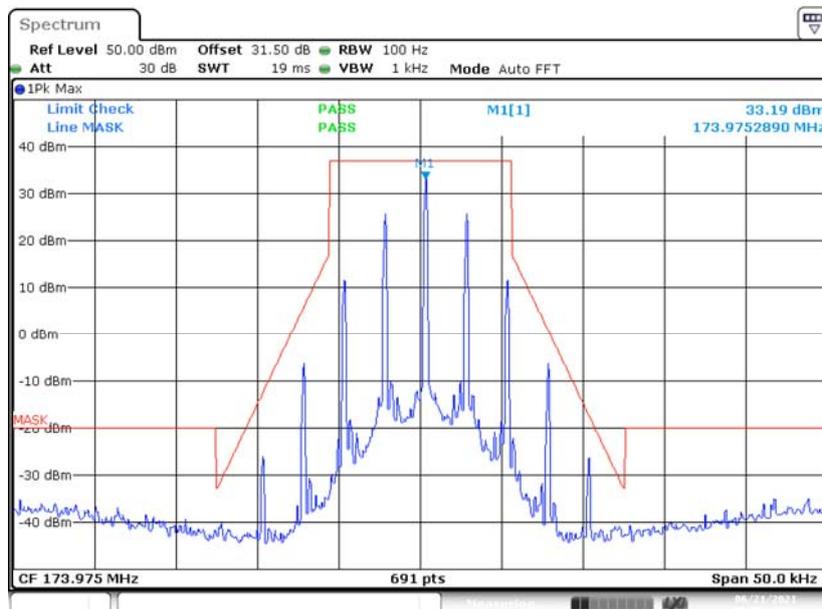
Date: 21.JUN.2021 15:39:34

**High Power, Occupied Bandwidth-136.025 MHz (4FSK 12.5kHz)**
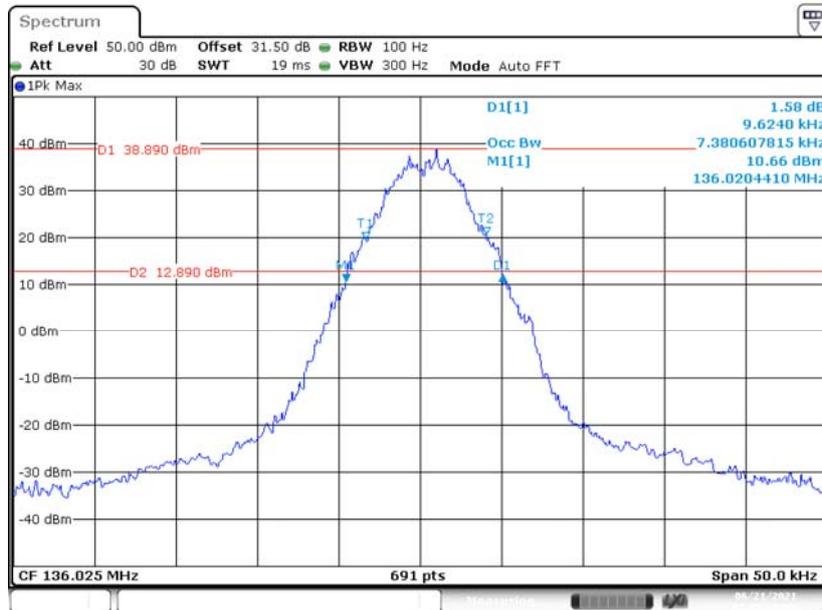
Date: 21.JUN.2021 13:29:00

Emission Mask D
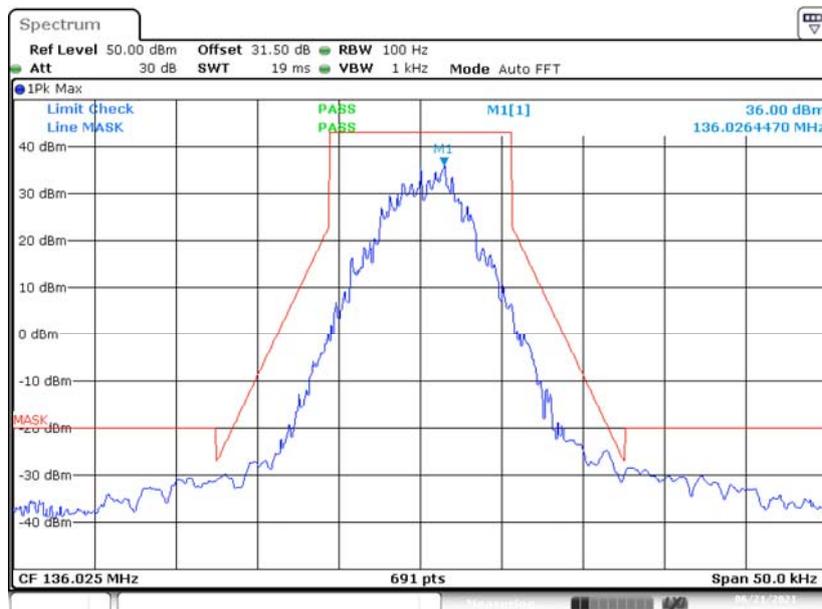
Date: 21.JUN.2021 15:29:05

Low Power, Occupied Bandwidth-136.025 MHz (4FSK 12.5kHz)
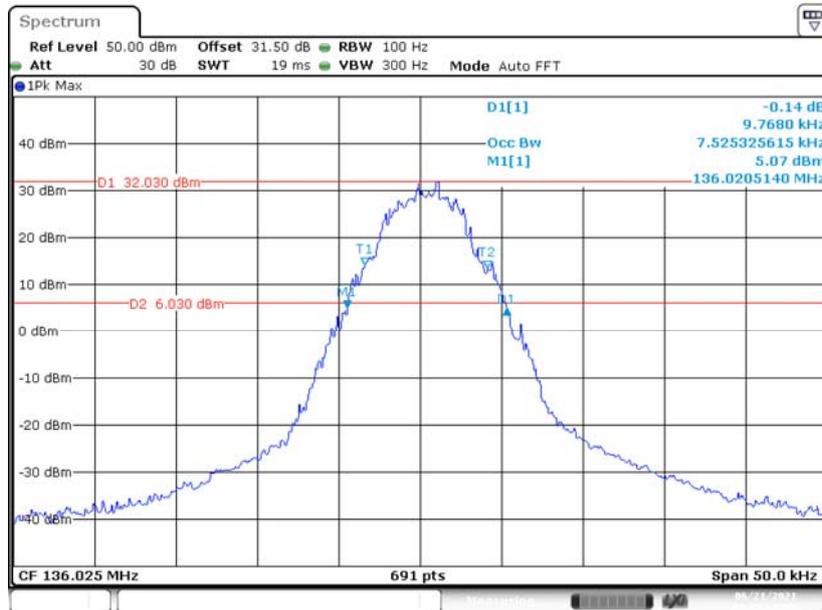

Date: 21.JUN.2021 13:40:41

Emission Mask D
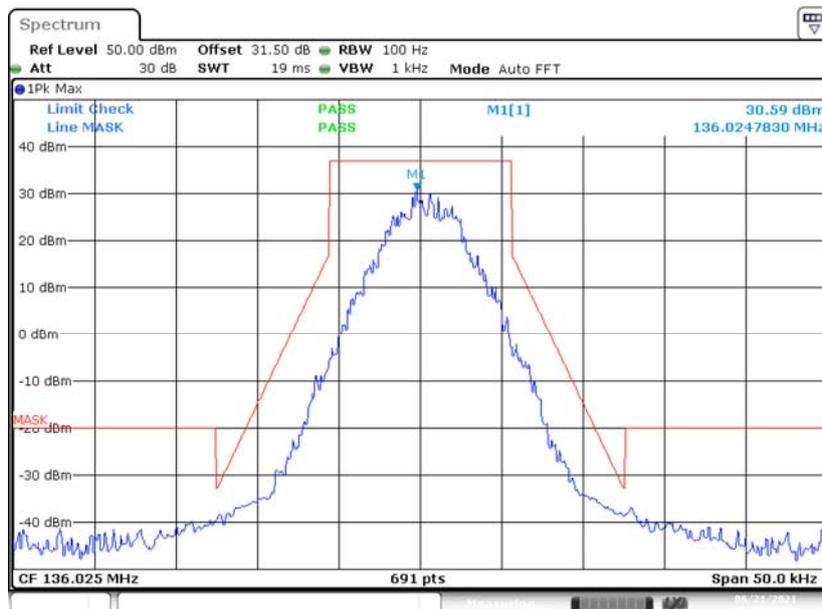
Date: 21.JUN.2021 15:34:48

High Power, Occupied Bandwidth-155.000 MHz (4FSK 12.5kHz)
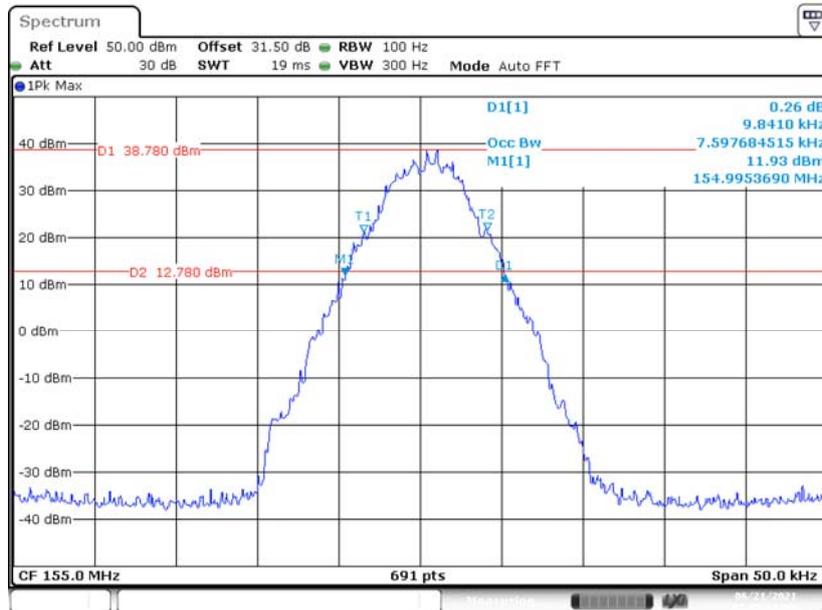
Date: 21.JUN.2021 13:36:04

**Emission Mask D**
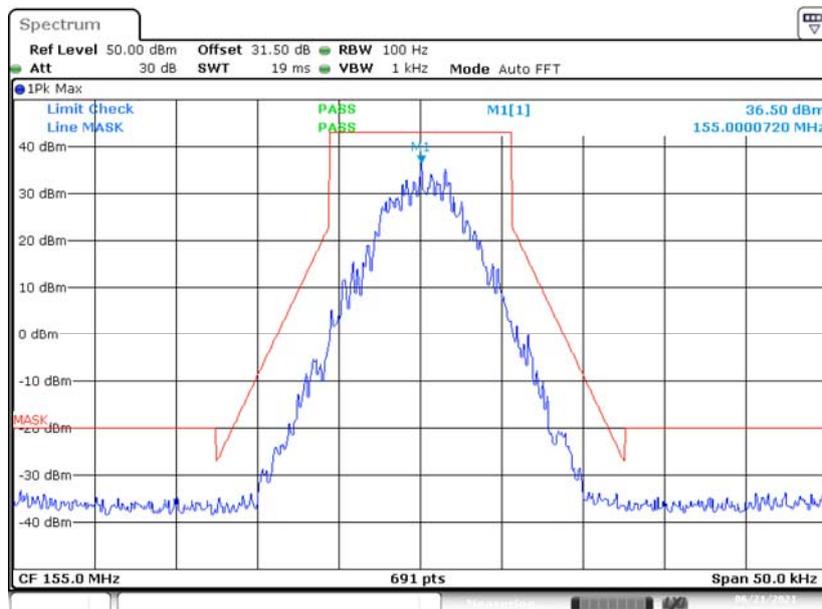
Date: 21.JUN.2021 15:29:48

Low Power, Occupied Bandwidth-155.000 MHz (4FSK 12.5kHz)
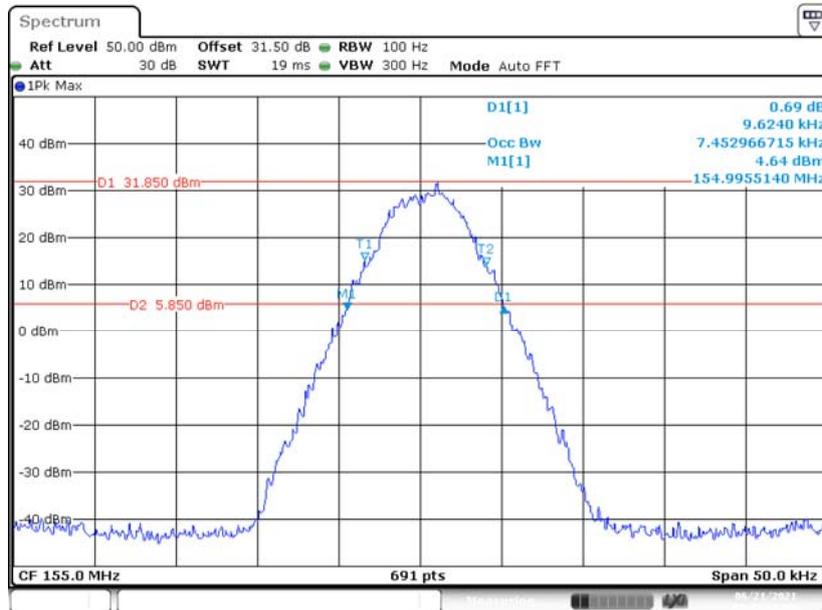
Date: 21.JUN.2021 13:44:09

Emission Mask D
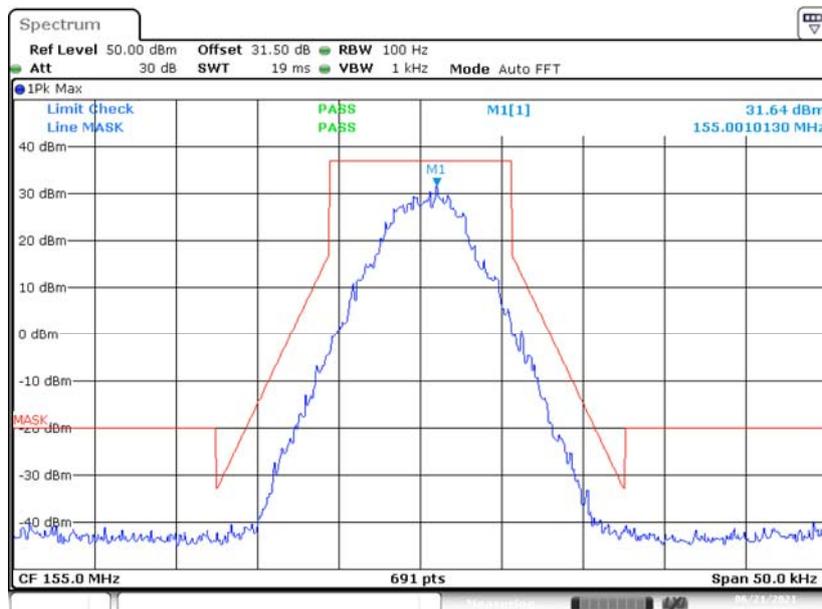
Date: 21.JUN.2021 15:33:54

High Power, Occupied Bandwidth-173.975 MHz (4FSK 12.5kHz)
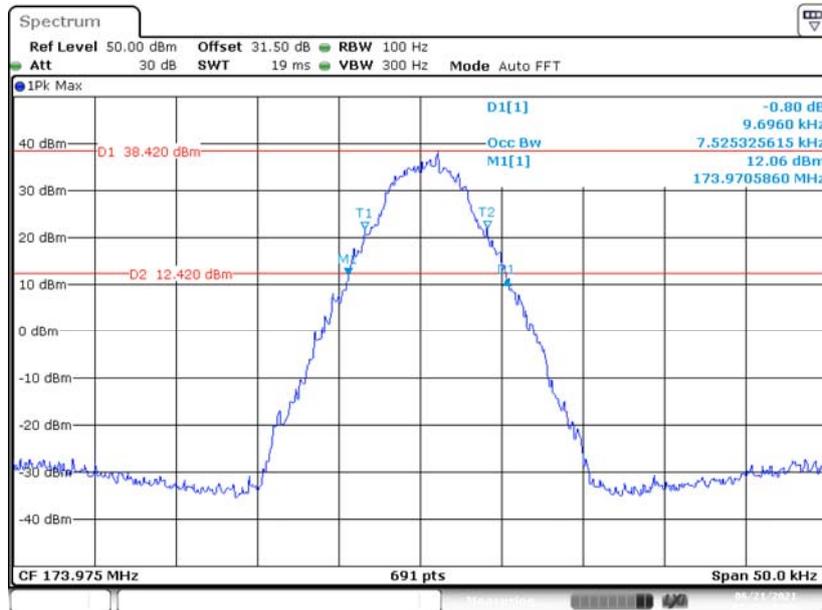

Date: 21.JUN.2021 13:32:20

Emission Mask D
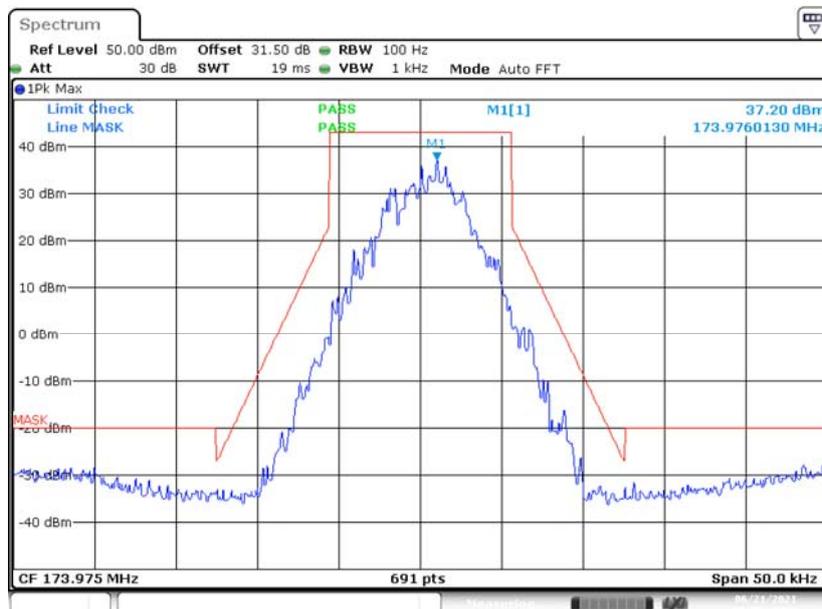
Date: 21.JUN.2021 15:30:17

Low Power, Occupied Bandwidth-173.975 MHz (4FSK 12.5kHz)
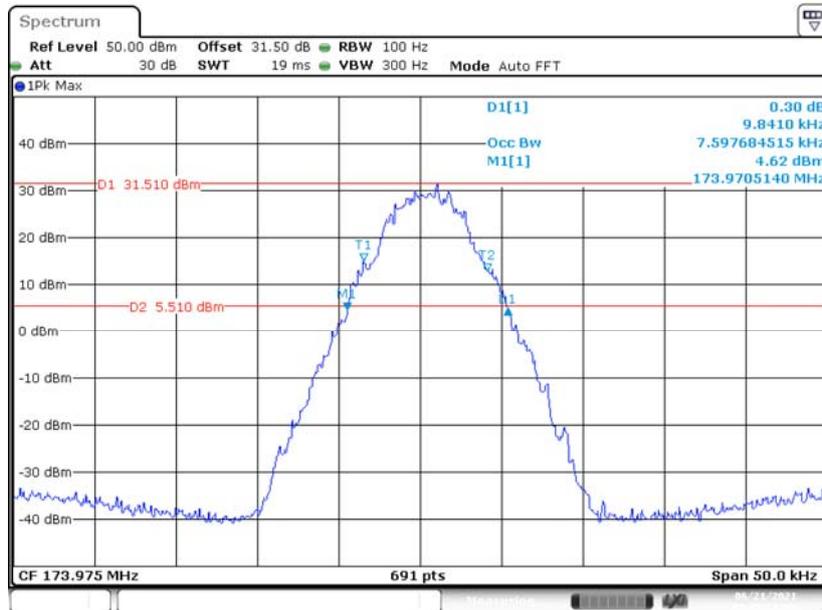
Date: 21.JUN.2021 13:45:23

Emission Mask D
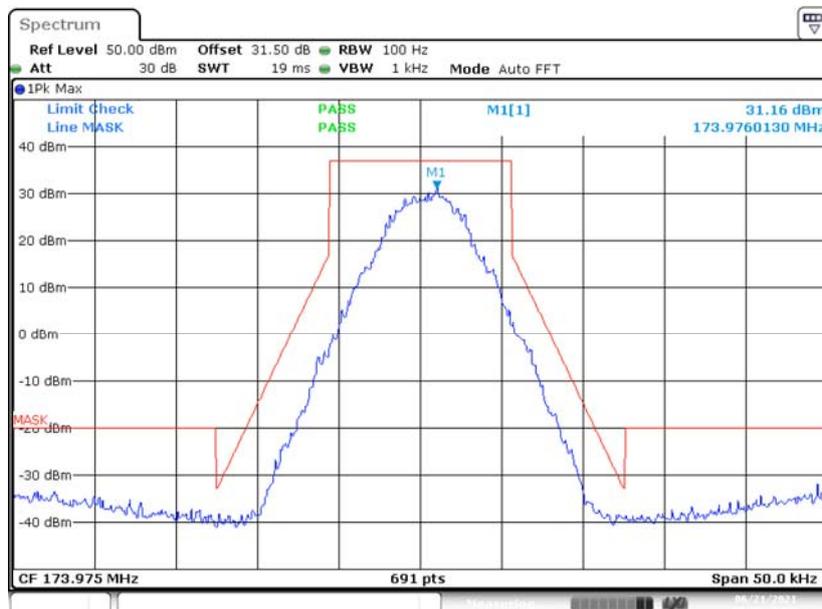
Date: 21.JUN.2021 15:33:18

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

Applicable Standard

FCC §2.1051,§90.210

Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz, and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Data

Environmental Conditions

Temperature:	24.7 ℃
Relative Humidity:	56 %
ATM Pressure:	101.9 kPa

The testing was performed by Stone Zhang on 2021-06-21.

EUT Operation Mode: Transmitting

Test Result: Compliant.

Conducted Spurious Emissions at Antenna Port(worst case is in high power)
UHF:

High Power, 400.025 MHz, (FM 12.5kHz)

Fundamental
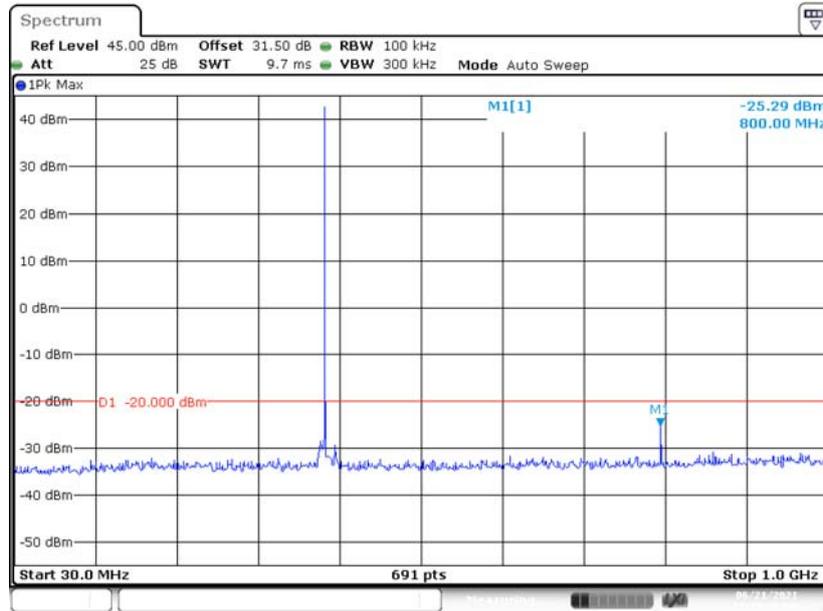
Date: 21.JUN.2021 11:29:21
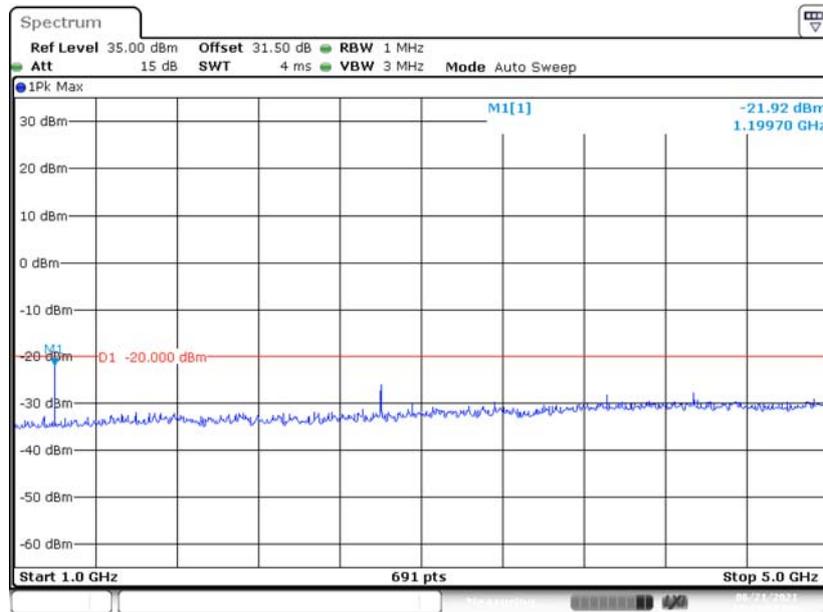
Date: 21.JUN.2021 11:42:07

High Power, 440.000 MHz, (FM 12.5kHz)

Fundamental
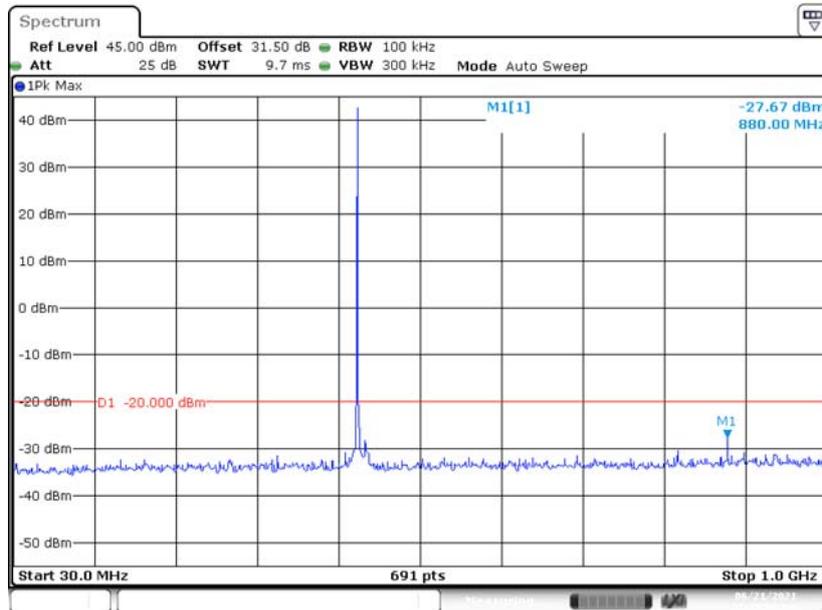
Date: 21.JUN.2021 11:29:50
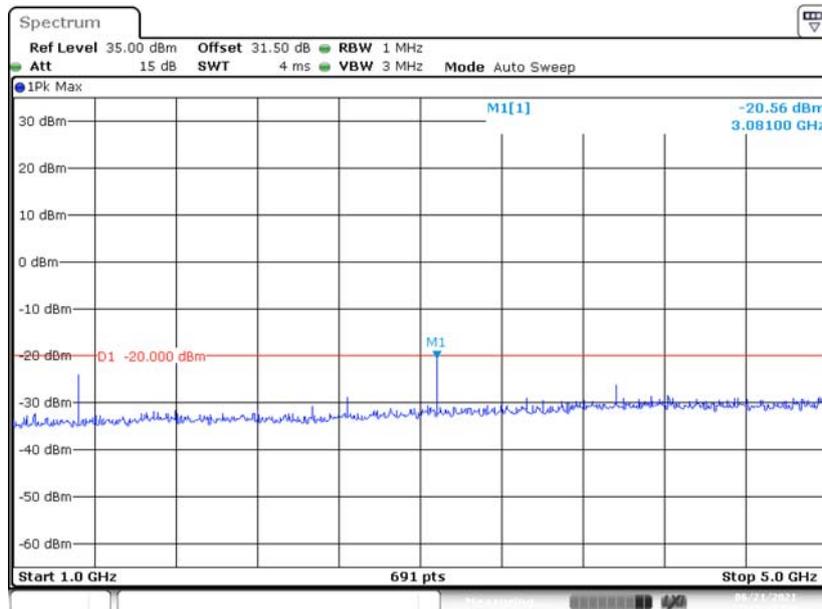
Date: 21.JUN.2021 11:42:31

High Power, 479.975 MHz, (FM 12.5kHz)

Fundamental
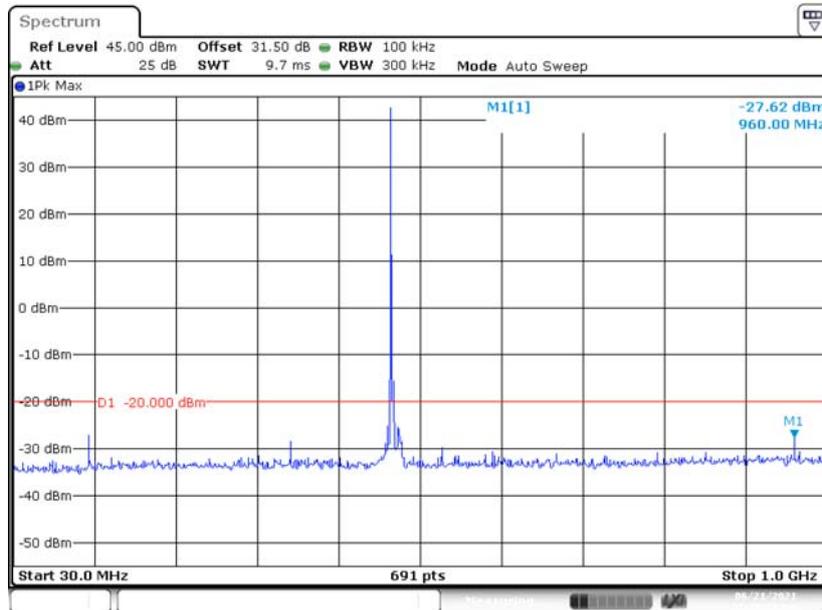
Date: 21.JUN.2021 11:30:21
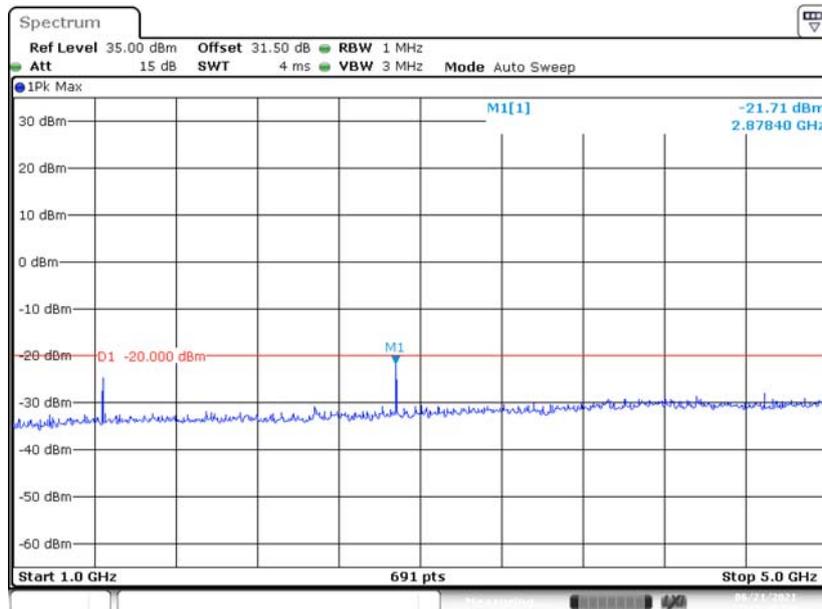
Date: 21.JUN.2021 11:43:40

High Power, 400.025 MHz, (4FSK 12.5kHz)
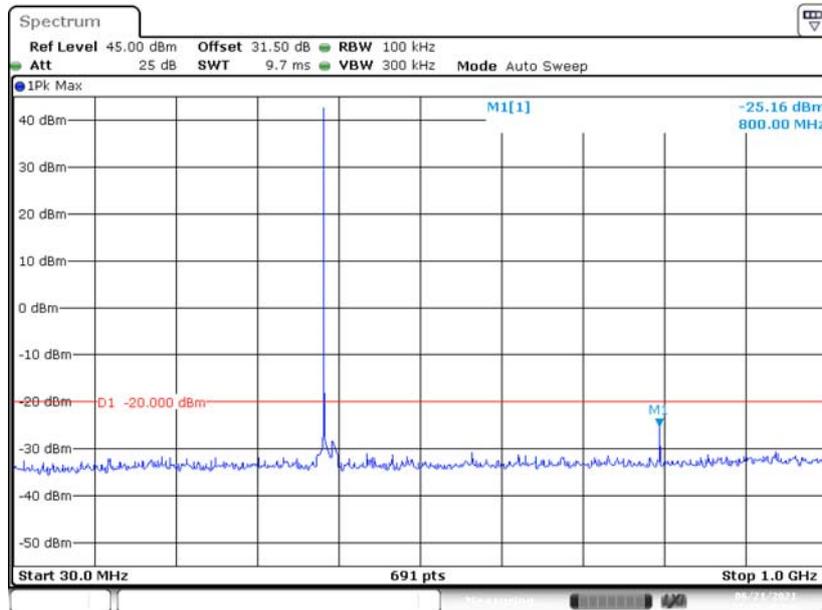
Fundamental

Date: 21.JUN.2021 11:23:10
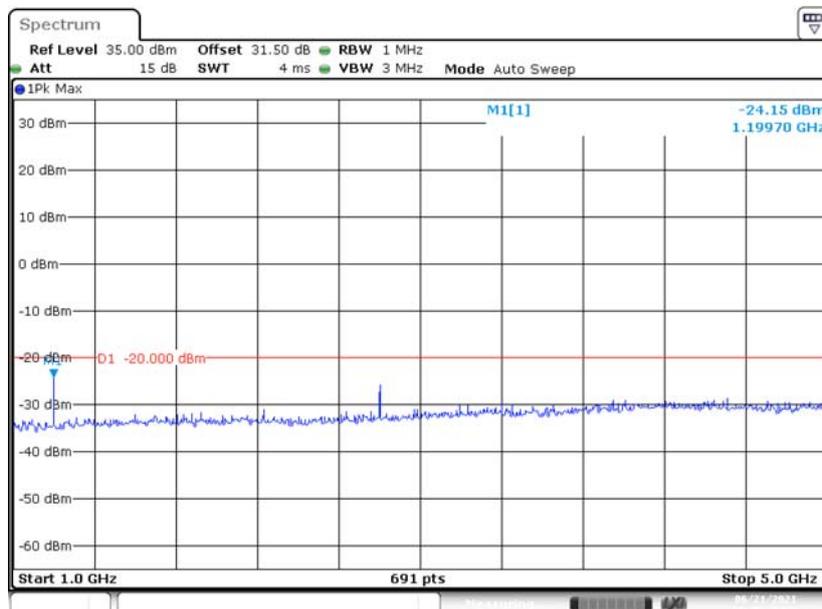
Date: 21.JUN.2021 11:40:47

High Power, 440.000 MHz, (4FSK 12.5kHz)

Fundamental
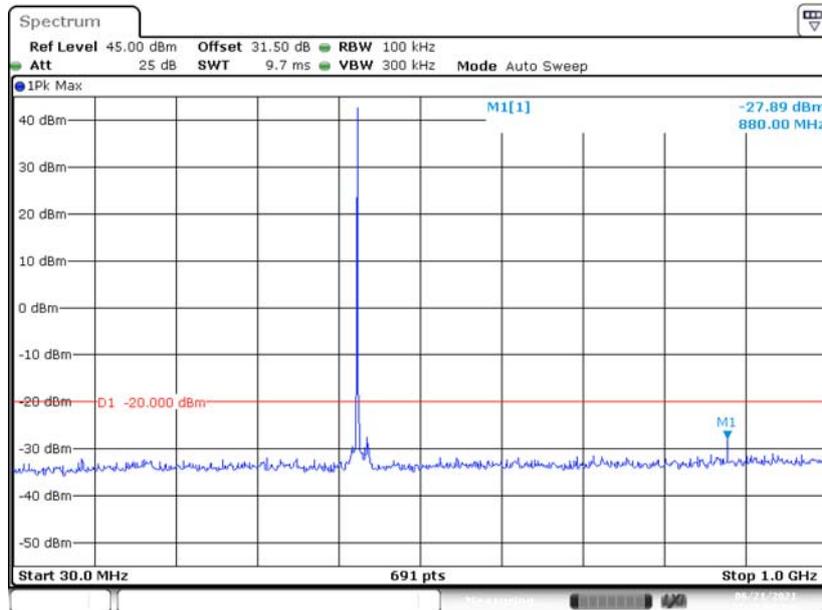
Date: 21.JUN.2021 11:26:09
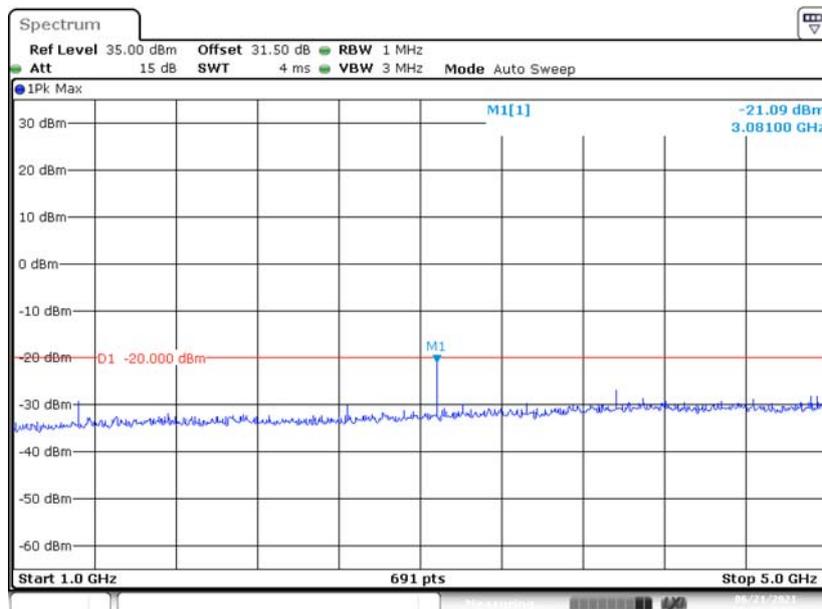
Date: 21.JUN.2021 11:41:13

High Power, 479.975 MHz, (4FSK 12.5kHz)

Fundamental
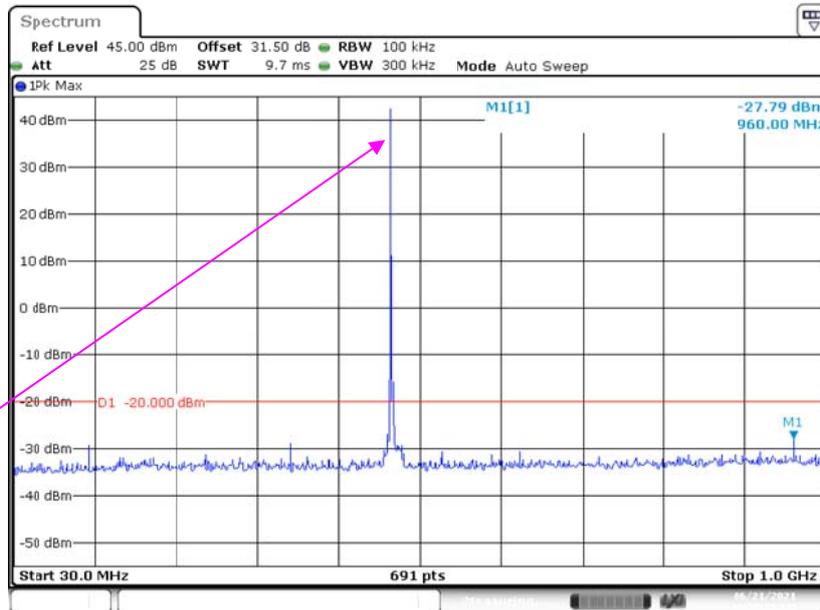
Date: 21.JUN.2021 11:28:17
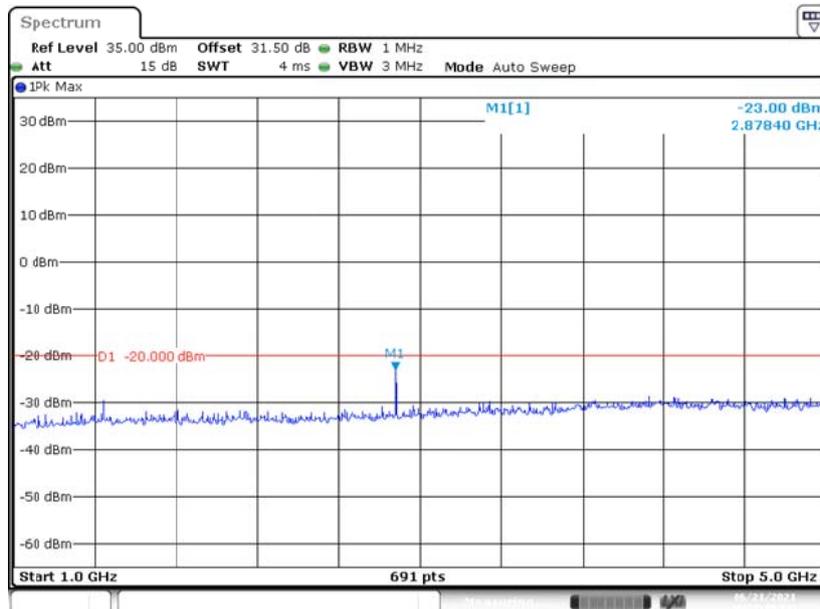
Date: 21.JUN.2021 11:41:39

VHF:

High Power, 136.025 MHz, (FM 12.5kHz)

Fundamental
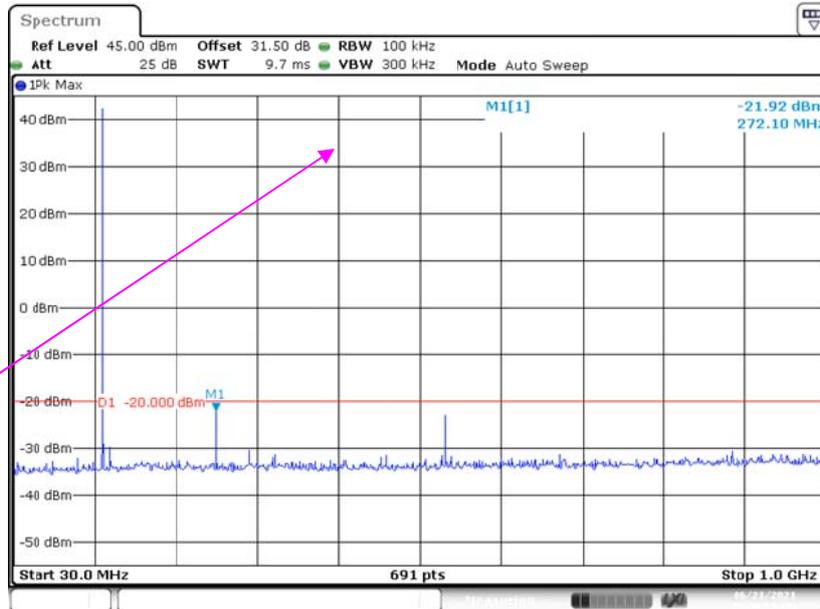
Date: 21.JUN.2021 15:48:51
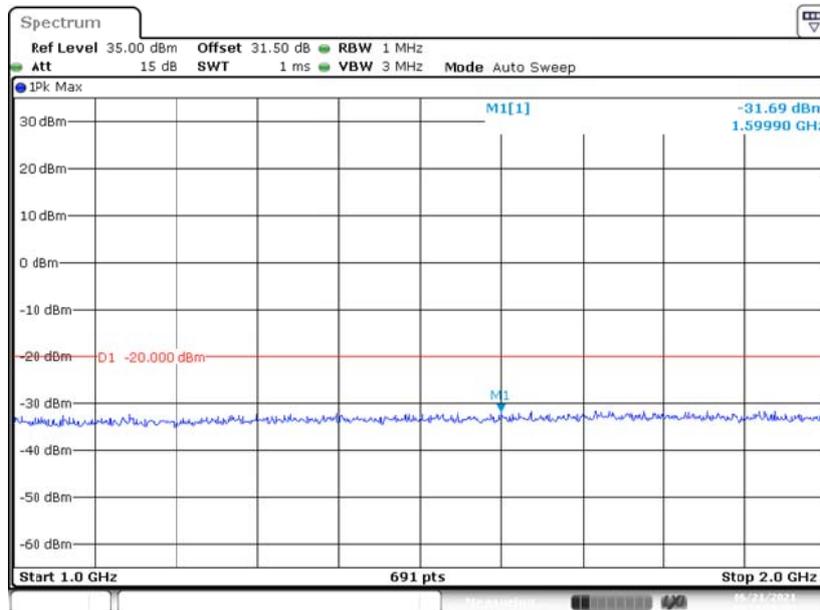
Date: 21.JUN.2021 16:14:39

High Power, 155.000 MHz, (FM 12.5kHz)

Date: 21.JUN.2021 15:50:30

Date: 21.JUN.2021 16:15:32
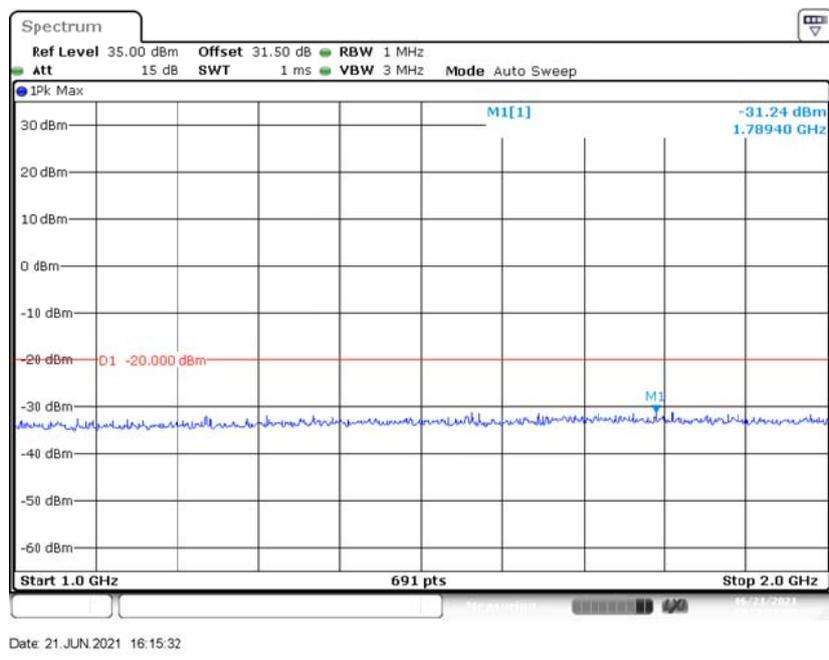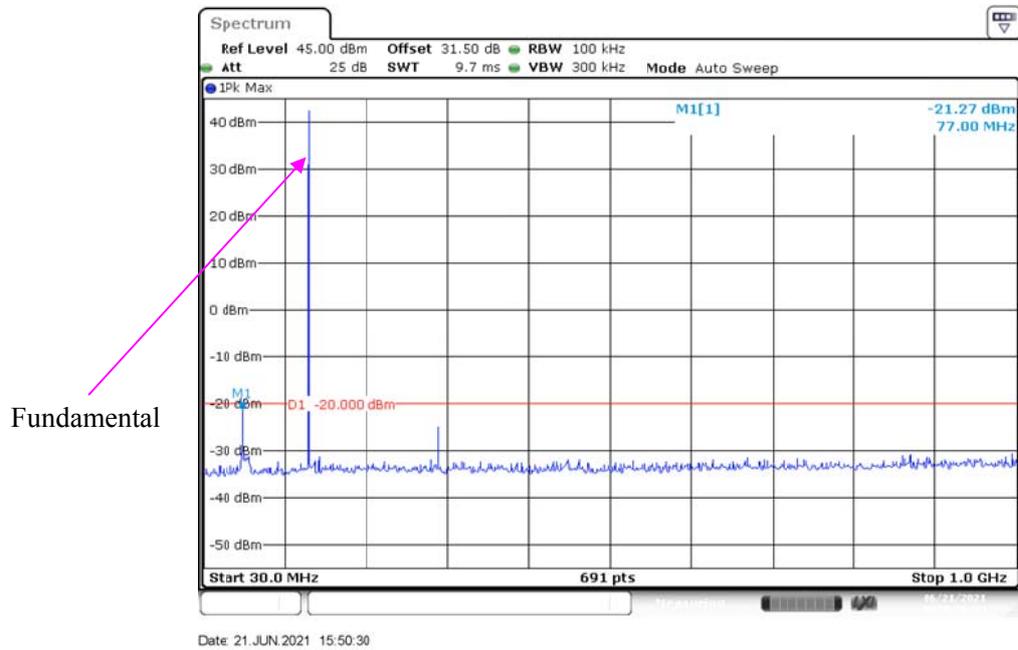
High Power, 173.975 MHz, (FM 12.5kHz)

Date: 21.JUN.2021 15:51:00

Date: 21.JUN.2021 16:16:09
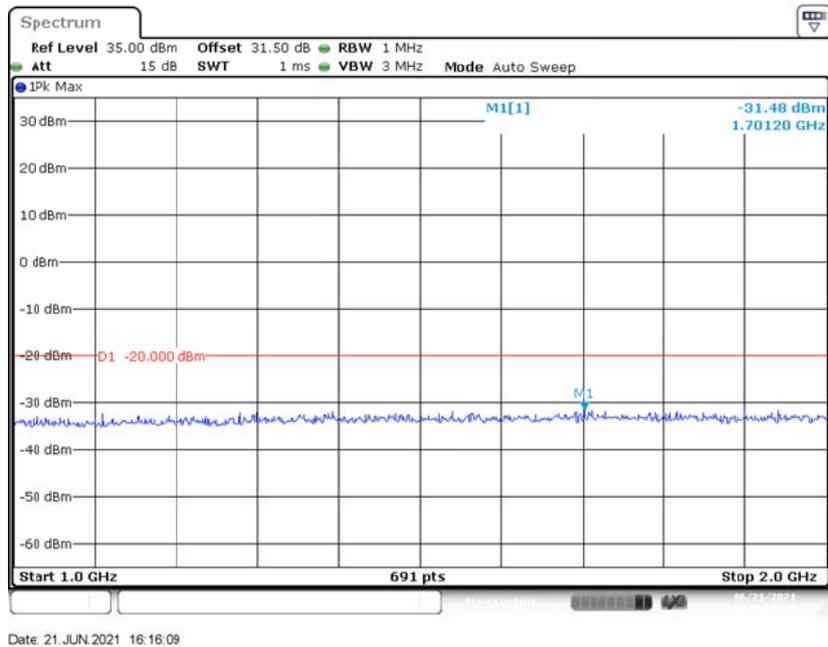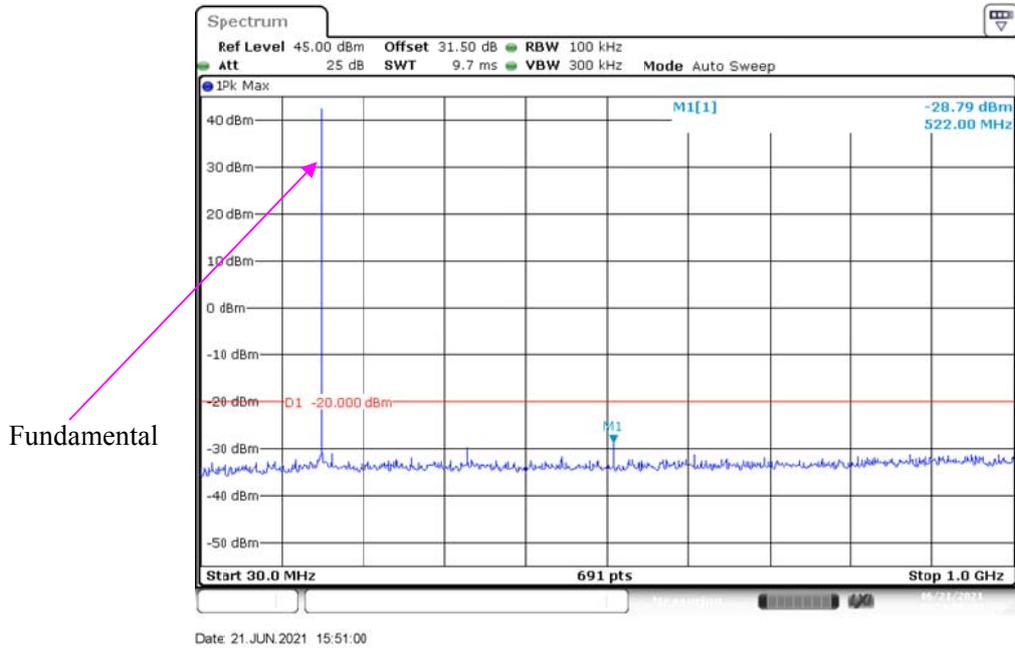
High Power, 136.025 MHz, (4FSK 12.5kHz)
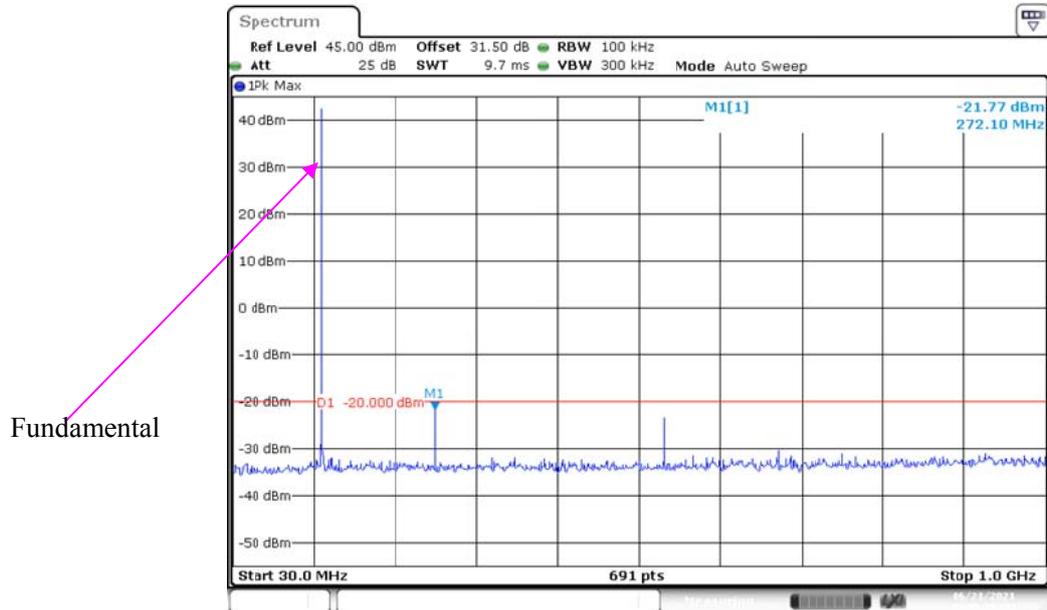
Fundamental

Date: 21.JUN.2021 15:45:18
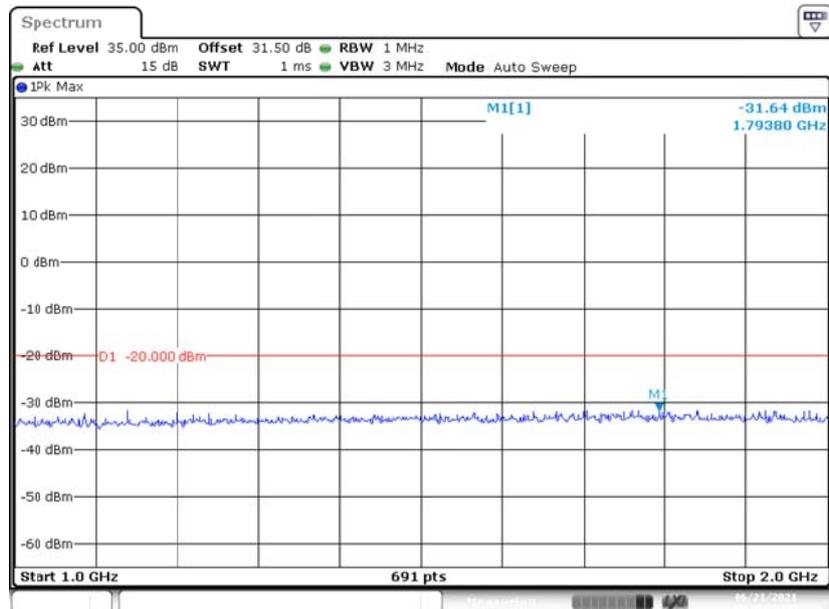
Date: 21.JUN.2021 16:16:46

High Power,155.000 MHz, (4FSK 12.5kHz)
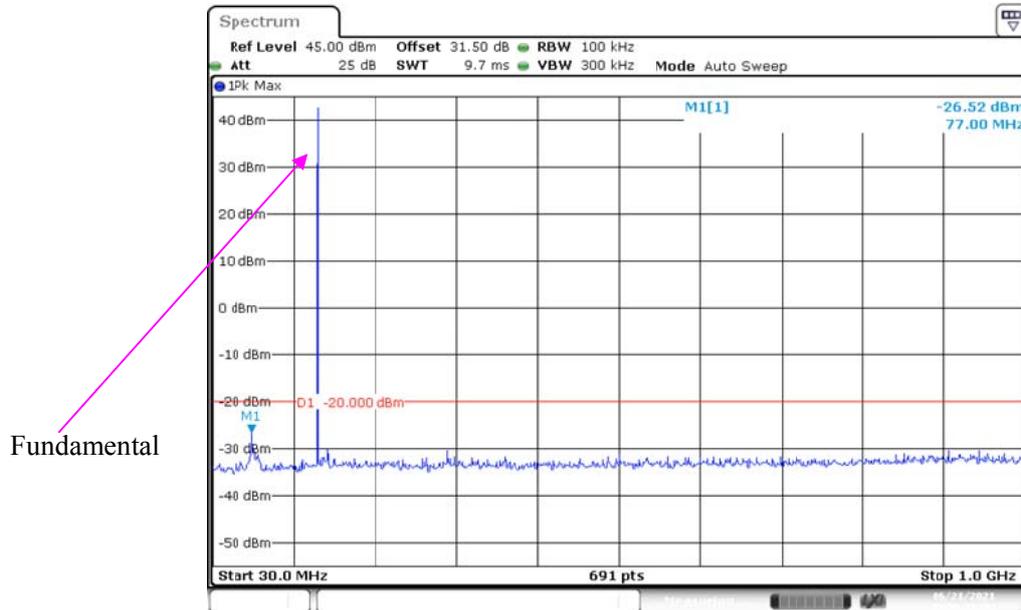
Date: 21.JUN.2021 15:46:22
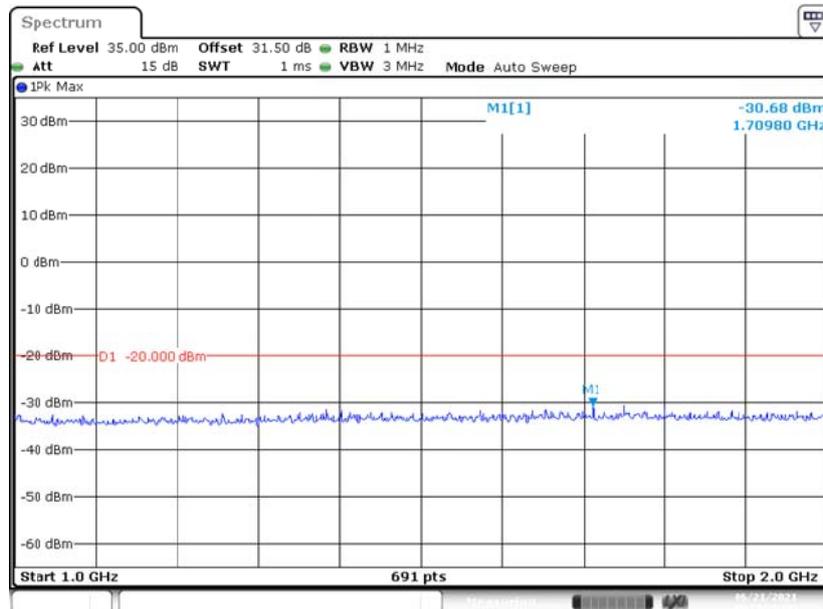
Date: 21.JUN.2021 16:17:23

High Power, 173.975 MHz, (4FSK 12.5kHz)
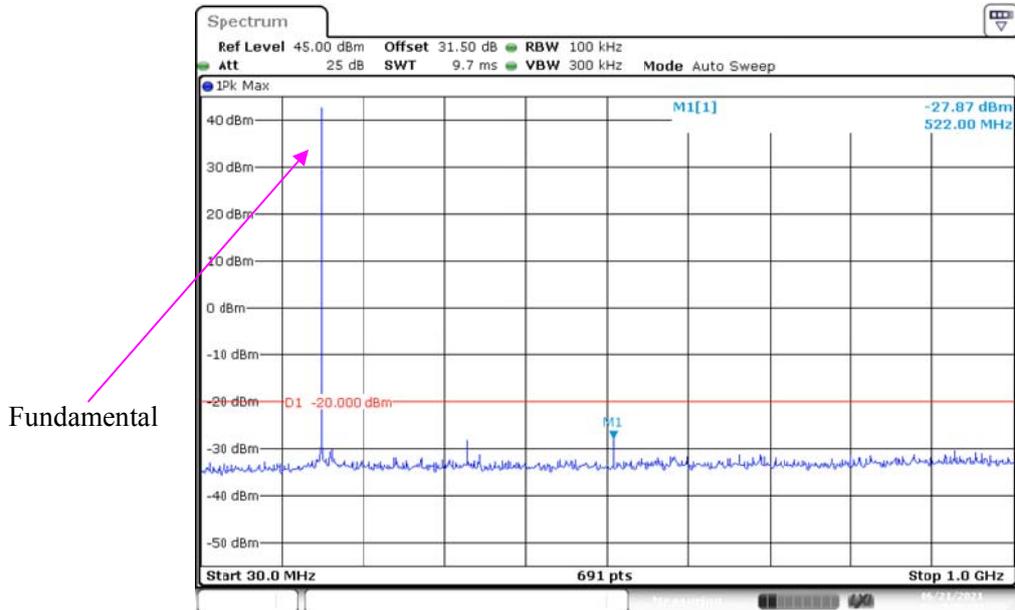
Date: 21.JUN.2021 15:47:06
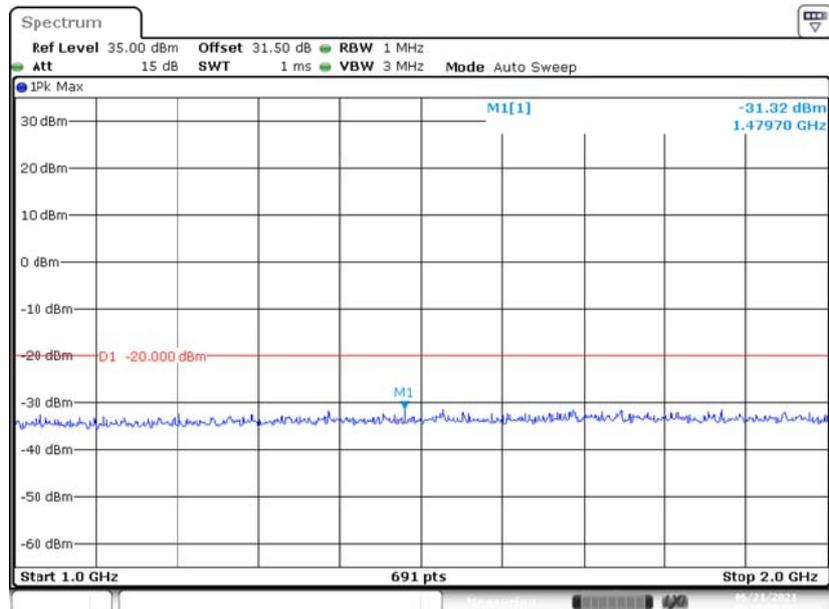
Date: 21.JUN.2021 16:18:00

FCC §2.1053 & §90.210 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC §2.1053, §90.210

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.

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

Test Data

Environmental Conditions

Temperature:	24.5 ℃
Relative Humidity:	54 %
ATM Pressure:	101.3 kPa

The testing was performed by Stone Zhang on 2021-06-24.

EUT Operation Mode: Transmitting in high power level (worst case)

30MHz - 5GHz:

UHF:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	SGLevel (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
FM, Frequency: 400.025 MHz										
800.05	60.56	93	150	H	-37.66	0.62	-1.25	-39.53	-20	19.53
800.05	59.79	102	150	V	-38.63	0.62	-1.25	-40.50	-20	20.50
1200.075	73.67	34	150	H	-40.10	0.80	7.36	-33.54	-20	13.54
1200.075	73.43	203	150	V	-40.34	0.80	7.36	-33.78	-20	13.78
FM, Frequency: 440.000 MHz										
880.00	57.84	142	150	H	-38.05	0.63	-1.01	-39.69	-20	19.69
880.00	57.55	301	150	V	-39.07	0.63	-1.01	-40.71	-20	20.71
1320.00	73.39	231	150	H	-40.62	0.81	7.7	-33.73	-20	13.73
1320.00	73.85	158	150	V	-40.16	0.81	7.7	-33.27	-20	13.27
FM, Frequency: 479.975 MHz										
959.95	59.16	95	150	H	-38.08	0.66	-1.19	-39.93	-20	19.93
959.95	55.33	45	150	V	-38.86	0.66	-1.19	-40.71	-20	20.71
1439.925	73.48	134	150	H	-40.77	0.82	8.03	-33.56	-20	13.56
1439.925	73.62	355	150	V	-40.63	0.82	8.03	-33.42	-20	13.42
4FSK, Frequency: 400.025 MHz										
800.05	59.47	183	150	H	-38.75	0.62	-1.25	-40.62	-20	20.62
800.05	59.23	338	150	V	-39.19	0.62	-1.25	-41.06	-20	21.06
1200.075	73.25	277	150	H	-40.52	0.80	7.36	-33.96	-20	13.96
1200.075	74.07	280	150	V	-39.70	0.80	7.36	-33.14	-20	13.14
4FSK, Frequency: 440.000 MHz										
880.00	57.48	243	150	H	-38.41	0.63	-1.01	-40.05	-20	20.05
880.00	57.43	144	150	V	-39.19	0.63	-1.01	-40.83	-20	20.83
1320.00	73.91	229	150	H	-40.10	0.81	7.7	-33.21	-20	13.21
1320.00	73.66	214	150	V	-40.35	0.81	7.7	-33.46	-20	13.46
4FSK, Frequency: 479.975 MHz										
959.95	59.45	63	150	H	-37.79	0.66	-1.19	-39.64	-20	19.64
959.95	56.27	288	150	V	-37.92	0.66	-1.19	-39.77	-20	19.77
1439.925	73.17	268	150	H	-41.08	0.82	8.03	-33.87	-20	13.87
1439.925	73.83	182	150	V	-40.42	0.82	8.03	-33.21	-20	13.21

Note:
1) Antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
2) Absolute Level = SG Level - Cable loss + Antenna Gain
3) Margin = Limit- Absolute Level

VHF:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	SGLevel (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
FM, Frequency: 136.025 MHz										
408.075	66.64	67	150	H	-37.49	0.53	-1.4	-39.42	-20	19.42
408.075	66.01	133	150	V	-38.38	0.53	-1.4	-40.31	-20	20.31
1224.225	73.44	115	150	H	-40.38	0.80	7.43	-33.75	-20	13.75
1224.225	69.65	191	150	V	-44.17	0.80	7.43	-37.54	-20	17.54
FM, Frequency: 155.000 MHz										
465.00	62.50	342	150	H	-37.36	0.55	-1.74	-39.65	-20	19.65
465.00	65.65	352	150	V	-37.84	0.55	-1.74	-40.13	-20	20.13
1240.00	73.52	2	150	H	-40.33	0.80	7.47	-33.66	-20	13.66
1240.00	73.40	176	150	V	-40.45	0.80	7.47	-33.78	-20	13.78
FM, Frequency: 173.975 MHz										
521.925	66.44	35	150	H	-37.51	0.58	-1.66	-39.75	-20	19.75
521.925	63.37	54	150	V	-38.02	0.58	-1.66	-40.26	-20	20.26
1217.825	73.69	238	150	H	-40.12	0.80	7.41	-33.51	-20	13.51
1217.825	74.08	162	150	V	-39.73	0.80	7.41	-33.12	-20	13.12
4FSK, Frequency: 136.025 MHz										
408.075	66.88	16	150	H	-37.25	0.53	-1.4	-39.18	-20	19.18
408.075	66.30	50	150	V	-38.09	0.53	-1.4	-40.02	-20	20.02
1242.225	73.73	124	150	H	-40.09	0.80	7.43	-33.46	-20	13.46
1242.225	73.27	128	150	V	-40.55	0.80	7.43	-33.92	-20	13.92
4FSK, Frequency: 155.000 MHz										
465.00	61.77	68	150	H	-38.09	0.55	-1.74	-40.38	-20	20.38
465.00	65.21	282	150	V	-38.28	0.55	-1.74	-40.57	-20	20.57
1240.00	73.47	272	150	H	-40.38	0.80	7.47	-33.71	-20	13.71
1240.00	73.50	45	150	V	-40.35	0.80	7.47	-33.68	-20	13.68
4FSK, Frequency: 173.975 MHz										
521.925	66.43	268	150	H	-37.52	0.58	-1.66	-39.76	-20	19.76
521.925	63.35	305	150	V	-38.04	0.58	-1.66	-40.28	-20	20.28
1217.825	73.25	255	150	H	-40.56	0.80	7.41	-33.95	-20	13.95
1217.825	73.94	73	150	V	-39.87	0.80	7.41	-33.26	-20	13.26

Note:
1) Antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
2) Absolute Level = SG Level - Cable loss + Antenna Gain
3) Margin = Limit- Absolute Level

FCC §2.1055 & §90.213 - FREQUENCY STABILITY

Applicable Standard

FCC §2.1055, §90.213

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external 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 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.

Test Data

Environmental Conditions

Temperature:	22.5℃
Relative Humidity:	53 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-24.

EUT Operation Mode: Transmitting

Test Result: Compliant.

UHF:

Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
		Reference Frequency：400.025MHz, High power				
FM	12.5 kHz	-30		400.02549	1.22	±2.5
		-20		400.02544	1.10	±2.5
		-10		400.02549	1.22	±2.5
		0		400.02542	1.05	±2.5
		10	13.8	400.02542	1.05	±2.5
		20		400.02544	1.10	±2.5
		30		400.02547	1.17	±2.5
		40		400.02544	1.10	±2.5
		50		400.02549	1.22	±2.5
		20	12.42	400.02549	1.22	±2.5
		20	15.18	400.02543	1.07	±2.5

Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
		Reference Frequency：440.000MHz, High power				
FM	12.5 kHz	-30		440.00046	1.05	±2.5
		-20		440.00049	1.11	±2.5
		-10		440.00047	1.07	±2.5
		0		440.00042	0.95	±2.5
		10	13.8	440.00042	0.95	±2.5
		20		440.00048	1.09	±2.5
		30		440.00043	0.98	±2.5
		40		440.00046	1.05	±2.5
		50		440.00047	1.07	±2.5
		20	12.42	440.00047	1.07	±2.5
		20	15.18	440.00041	0.93	±2.5

| Reference Frequency：479.975MHz, High power | | | | | |
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
FM	12.5 kHz	-30	13.8	479.97547	0.98	±2.5
		-20		479.97542	0.88	±2.5
		-10		479.97541	0.85	±2.5
		0		479.97541	0.85	±2.5
		10		479.97549	1.02	±2.5
		20		479.97547	0.98	±2.5
		30		479.97549	1.02	±2.5
		40		479.97543	0.90	±2.5
		50		479.97547	0.98	±2.5
		20	12.42	479.97544	0.92	±2.5
		20	15.18	479.97544	0.92	±2.5

Reference Frequency：400.025MHz, High power						
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
4FSK	12.5 kHz	-30	13.8	400.02541	1.02	±2.5
		-20		400.02549	1.22	±2.5
		-10		400.0255	1.25	±2.5
		0		400.02549	1.22	±2.5
		10		400.02549	1.22	±2.5
		20		400.02544	1.10	±2.5
		30		400.02549	1.22	±2.5
		40		400.02547	1.17	±2.5
		50		400.02545	1.12	±2.5
		20	12.42	400.02542	1.05	±2.5
		20	15.18	400.02548	1.20	±2.5

Reference Frequency：440.000MHz, High power						
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
4FSK	12.5 kHz	-30	13.8	440.00043	0.98	±2.5
		-20		440.00049	1.11	±2.5
		-10		440.00041	0.93	±2.5
		0		440.00044	1.00	±2.5
		10		440.00047	1.07	±2.5
		20		440.00048	1.09	±2.5
		30		440.00044	1.00	±2.5
		40		440.00042	0.95	±2.5
		50		440.00041	0.93	±2.5
		20	12.42	440.00048	1.09	±2.5
		20	15.18	440.00043	0.98	±2.5

Reference Frequency：479.975MHz, High power					
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
4FSK	12.5 kHz	-30	13.8	479.97545	0.94	±2.5
		-20		479.97541	0.85	±2.5
		-10		479.97547	0.98	±2.5
		0		479.97549	1.02	±2.5
		10		479.97546	0.96	±2.5
		20		479.97541	0.85	±2.5
		30		479.97545	0.94	±2.5
		40		479.97546	0.96	±2.5
		50		479.97546	0.96	±2.5
		20	12.42	479.97548	1.00	±2.5
		20	15.18	479.97549	1.02	±2.5

VHF:

Reference Frequency：136.025MHz, High power						
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V_DC)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
FM	12.5 kHz	-30	13.8	136.02511	0.81	±2.5
		-20		136.02513	0.96	±2.5
		-10		136.0252	1.47	±2.5
		0		136.02517	1.25	±2.5
		10		136.02511	0.81	±2.5
		20		136.02511	0.81	±2.5
		30		136.02516	1.18	±2.5
		40		136.02513	0.96	±2.5
		50		136.02516	1.18	±2.5
		20	12.42	136.02512	0.88	±2.5
		20	15.18	136.02513	0.96	±2.5

Reference Frequency：155.000MHz, High power						
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V_DC)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
FM	12.5 kHz	-30	13.8	155.00019	1.23	±2.5
		-20		155.00012	0.77	±2.5
		-10		155.0002	1.29	±2.5
		0		155.00014	0.90	±2.5
		10		155.00017	1.10	±2.5
		20		155.00016	1.03	±2.5
		30		155.0002	1.29	±2.5
		40		155.00018	1.16	±2.5
		50		155.00018	1.16	±2.5
		20	12.42	155.00014	0.90	±2.5
		20	15.18	155.00013	0.84	±2.5

Reference Frequency：173.975MHz, High power						
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
FM	12.5 kHz	-30	13.8	173.97513	0.75	±2.5
		-20		173.97516	0.92	±2.5
		-10		173.9752	1.15	±2.5
		0		173.97511	0.63	±2.5
		10		173.97512	0.69	±2.5
		20		173.97519	1.09	±2.5
		30		173.97516	0.92	±2.5
		40		173.97517	0.98	±2.5
		50		173.9752	1.15	±2.5
		20	12.42	173.97515	0.86	±2.5
		20	15.18	173.97514	0.80	±2.5

Reference Frequency：136.025MHz, High power						
Modulation Mode	**ChannelSpacing(kHz)**	**Environment Temperature** (℃)	**Power Supply** (V$_{DC}$)	**Measured Frequency** (MHz)	**Frequency Error** (ppm)	**Limit** (ppm)
4FSK	12.5 kHz	-30	13.8	136.02519	1.40	±2.5
		-20		136.02516	1.18	±2.5
		-10		136.02517	1.25	±2.5
		0		136.02516	1.18	±2.5
		10		136.02511	0.81	±2.5
		20		136.02514	1.03	±2.5
		30		136.02514	1.03	±2.5
		40		136.02516	1.18	±2.5
		50		136.02513	0.96	±2.5
		20	12.42	136.02514	1.03	±2.5
		20	15.18	136.02519	1.40	±2.5

Reference Frequency：155.000MHz, High power						
Modulation Mode	**ChannelSpacing(kHz)**	**Environment Temperature** (℃)	**Power Supply** (V$_{DC}$)	**Measured Frequency** (MHz)	**Frequency Error** ppm	**Limit** ppm
4FSK	12.5 kHz	-30	13.8	155.00019	1.23	±2.5
		-20		155.00014	0.90	±2.5
		-10		155.00014	0.90	±2.5
		0		155.00018	1.16	±2.5
		10		155.00011	0.71	±2.5
		20		155.00014	0.90	±2.5
		30		155.00012	0.77	±2.5
		40		155.00014	0.90	±2.5
		50		155.00013	0.84	±2.5
		20	12.42	155.00017	1.10	±2.5
		20	15.18	155.00012	0.77	±2.5

Reference Frequency：173.975MHz, High power						
Modulation Mode	ChannelSpacing(kHz)	Environment Temperature (℃)	Power Supply (V$_{DC}$)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
4FSK	12.5 kHz	-30	13.8	173.97519	1.09	±2.5
		-20		173.97511	0.63	±2.5
		-10		173.97516	0.92	±2.5
		0		173.97518	1.03	±2.5
		10		173.97515	0.86	±2.5
		20		173.97515	0.86	±2.5
		30		173.97514	0.80	±2.5
		40		173.97513	0.75	±2.5
		50		173.97511	0.63	±2.5
		20	12.42	173.97513	0.75	±2.5
		20	15.18	173.97517	0.98	±2.5

FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

Regulations: FCC §90.214

Test method: ANSI C63.26.

Test Procedure

a) Connect the EUT and test equipment as shown on the following block diagram.

b) Set the Spectrum Analyzer to measure FM deviation, and tune the RF frequency to the transmitter assigned frequency.

c) Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at $\pm$ 12.5 kHz deviation and set its output level to -100dBm.

d) Turn on the transmitter.

e) Supply sufficient attenuation via the RF attenuator to provide an input level to the Spectrum Analyzer that is 40 dB below the maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the Spectrum Analyzer as P0.

f) Turn off the transmitter.

g) Adjust the RF level of the signal generator to provide RF power equal to P0. This signal generator RF level shall be maintained throughout the rest of the measurement.

h) Remove the attenuation 1, so the input power to the Spectrum Analyzer is increased by 30 dB when the transmitter is turned on.

i) Adjust the vertical amplitude control of the spectrum analyzer to display the 1000 Hz at ±4 divisions vertically centered on the display. Set trigger mode of the Spectrum Analyzer to "Video", and tune the "trigger level" on suitable level. Then set the "tiger offset" to -10ms for turn on and -15ms for turn off.

j) Turn on the transmitter and the transient wave will be captured on the screen of Spectrum Analyzer. Observe the stored display. The instant when the 1 kHz test signal is completely suppressed is considered to be ton. The trace should be maintained within the allowed divisions during the period t1 and t2.

k) Then turn off the transmitter, and another transient wave will be captured on the screen of Spectrum Analyzer. The trace should be maintained within the allowed divisions during the period t3.
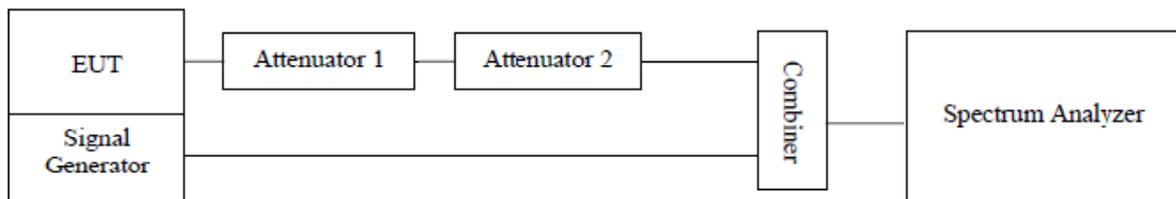
Test Data

Environmental Conditions

Temperature:	23.3 ℃
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-23.

UHF:

Band	Channel Spacing (kHz)	Transient Period (ms)	Transient Frequency(kHz)	Result
400-480MHz	12.5	<10(t_1)	±12.5	Pass
		<25(t_2)	±6.25	
		<10(t_3)	±12.5	

Please refer to the following plots:

FM, Frequency:400.025 MHz, High Power-12.5kHz
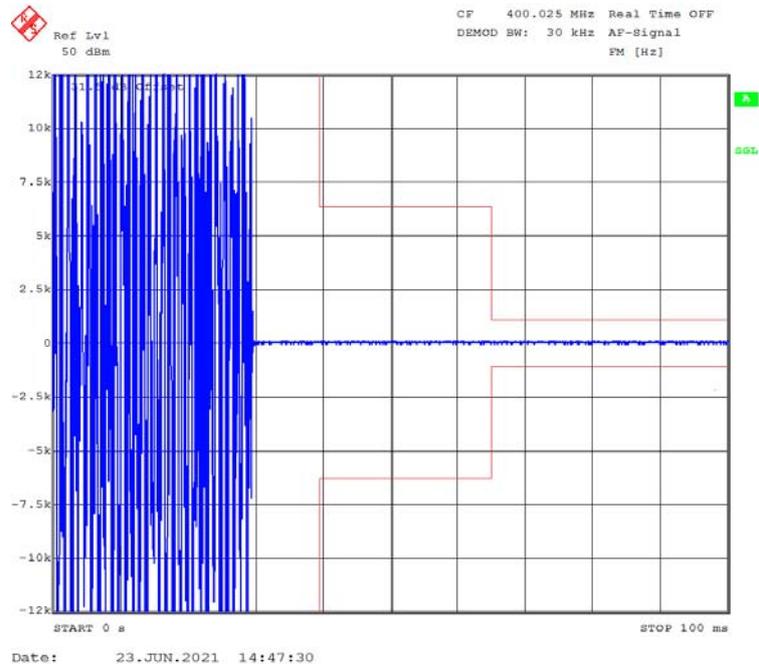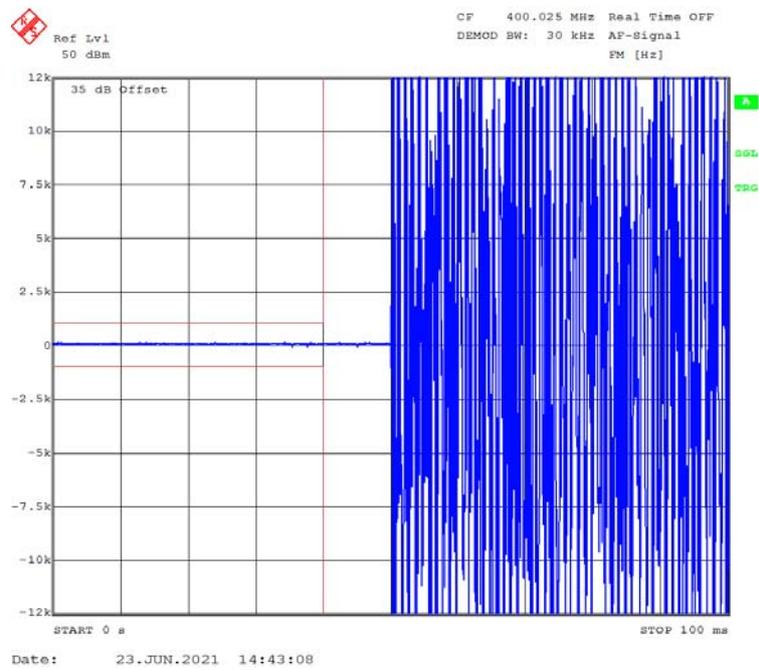
Turn on

Date: 23.JUN.2021 14:47:30

Turn off

Date: 23.JUN.2021 14:43:08

FM, Frequency:440.000 MHz, High Power-12.5kHz

Turn on

Date: 23.JUN.2021   14:45:46

Turn off

Date: 23.JUN.2021   14:43:39

FM, Frequency:479.975 MHz, High Power-12.5kHz

Turn on

Date: 23.JUN.2021   14:45:22

Turn off

Date: 23.JUN.2021   14:44:34
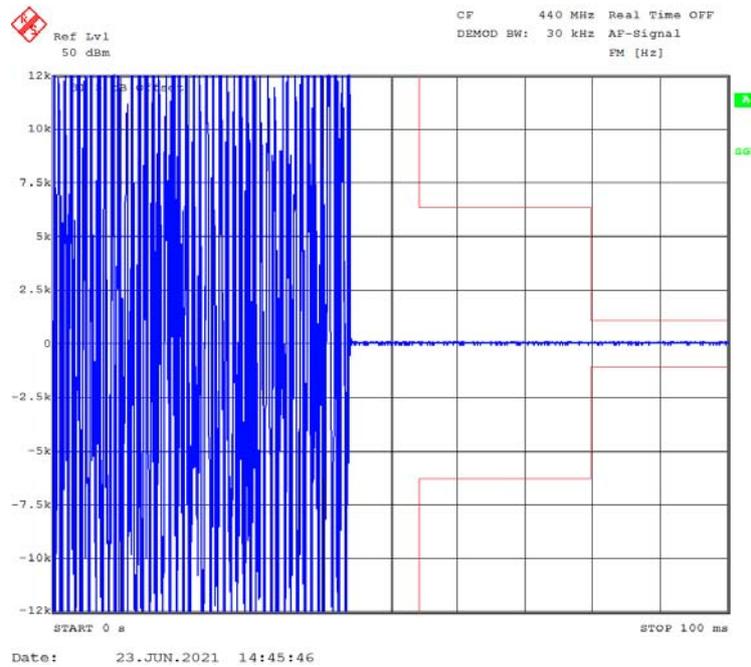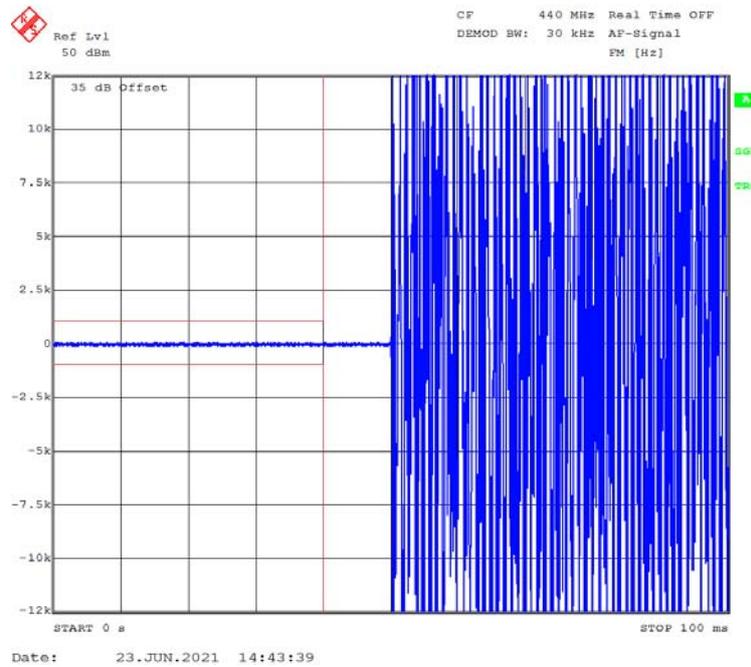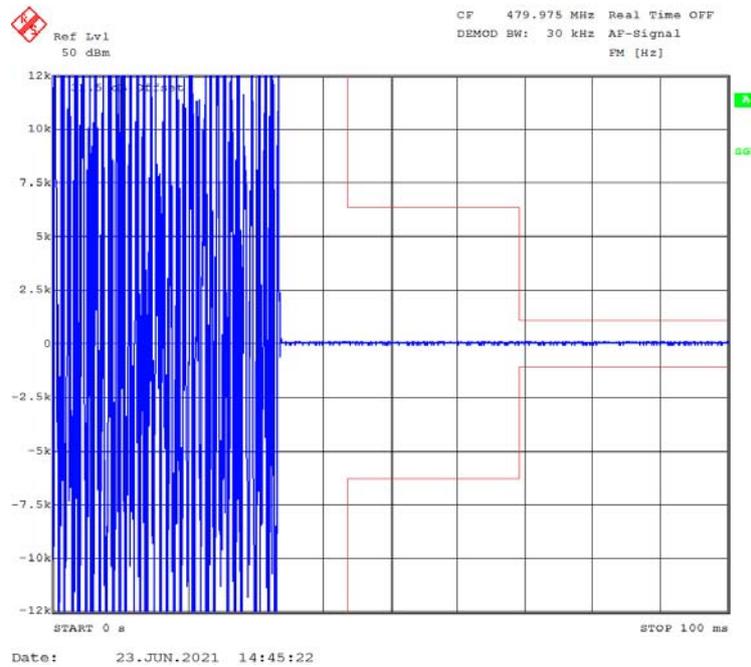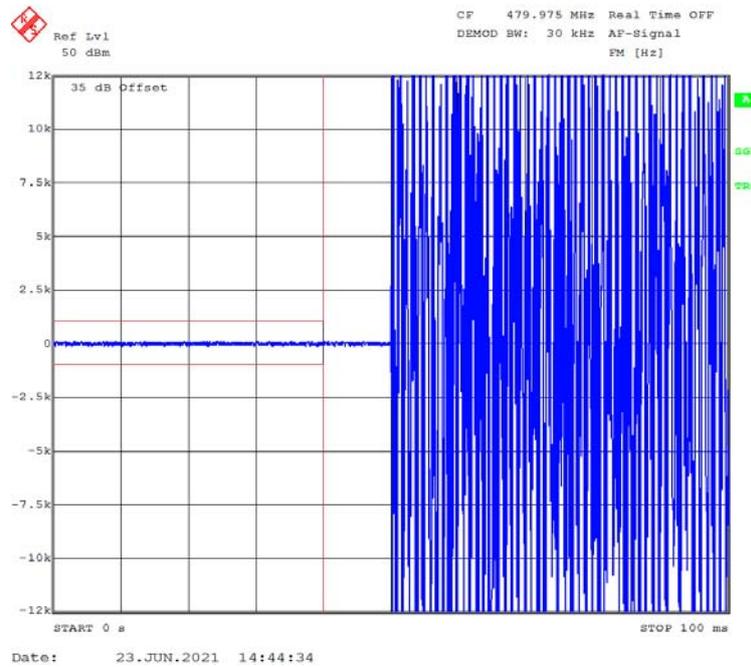
VHF:

Band	Channel Spacing (kHz)	Transient Period (ms)	Transient Frequency(kHz)	Result
136-174MHz	12.5	<5(t_1)	±12.5	Pass
		<20(t_2)	±6.25	
		<5(t_3)	±12.5	

FM, Frequency:136.025 MHz, High Power-12.5kHz
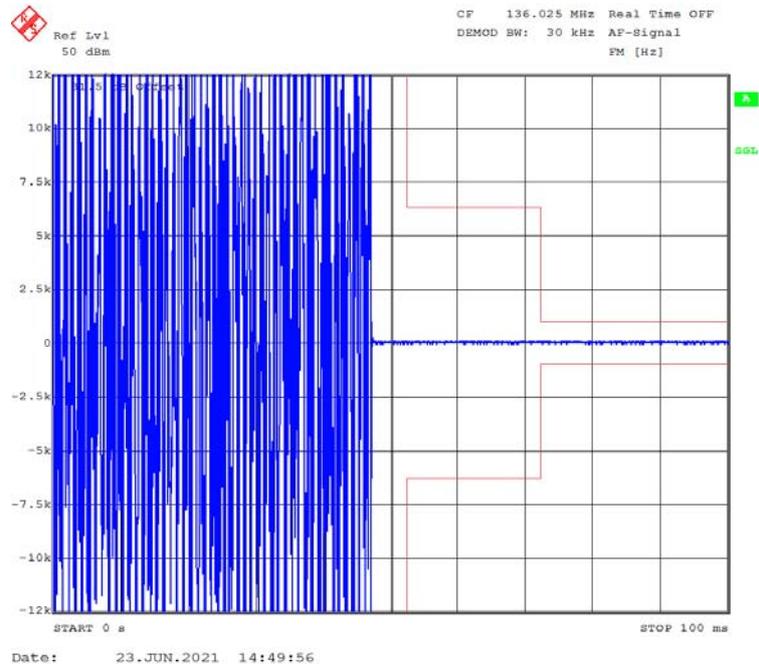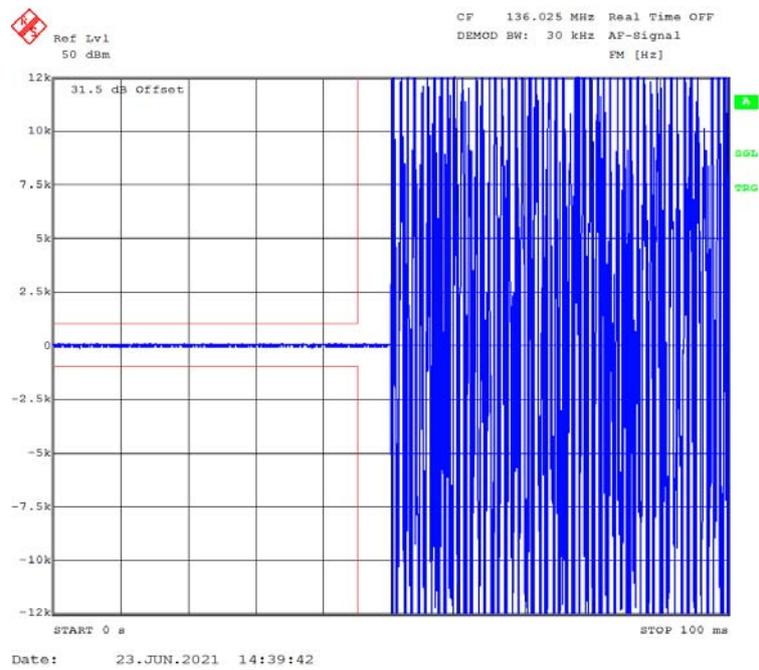
Turn on

Date: 23.JUN.2021   14:49:56

Turn off

Date: 23.JUN.2021   14:39:42

FM, Frequency:155.000 MHz, High Power-12.5kHz

Turn on

Date:　　23.JUN.2021　14:49:18

Turn off

Date:　　23.JUN.2021　14:40:43

FM, Frequency:173.975 MHz, High Power-12.5kHz

Turn on

Date: 23.JUN.2021   14:48:01

Turn off

Date: 23.JUN.2021   14:42:18
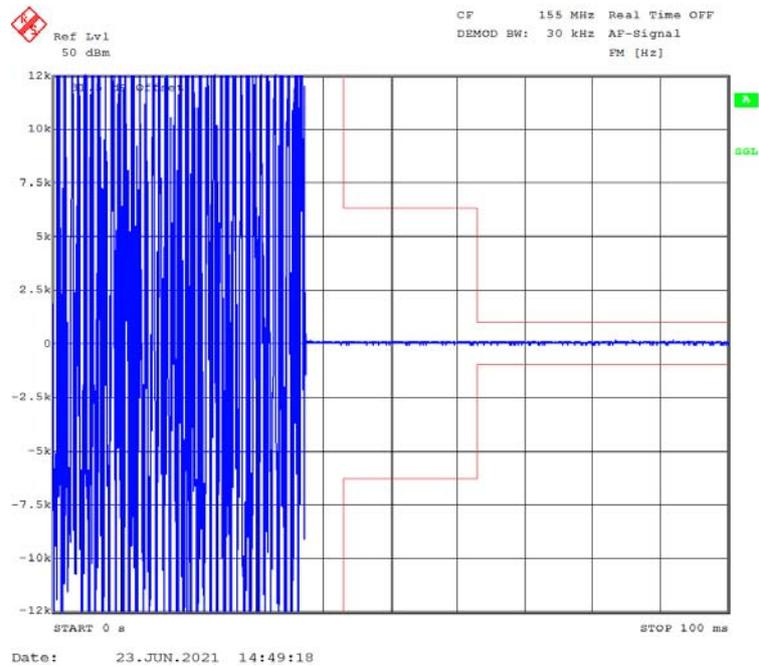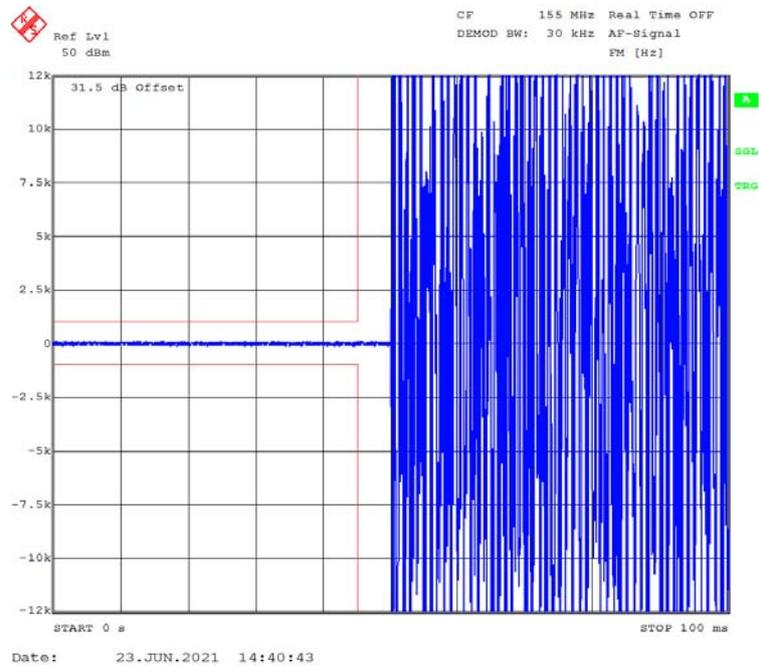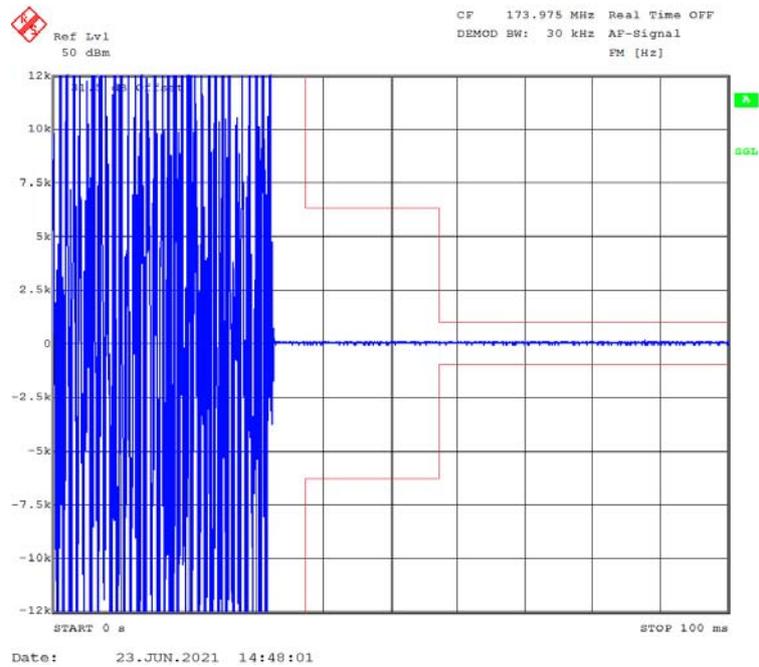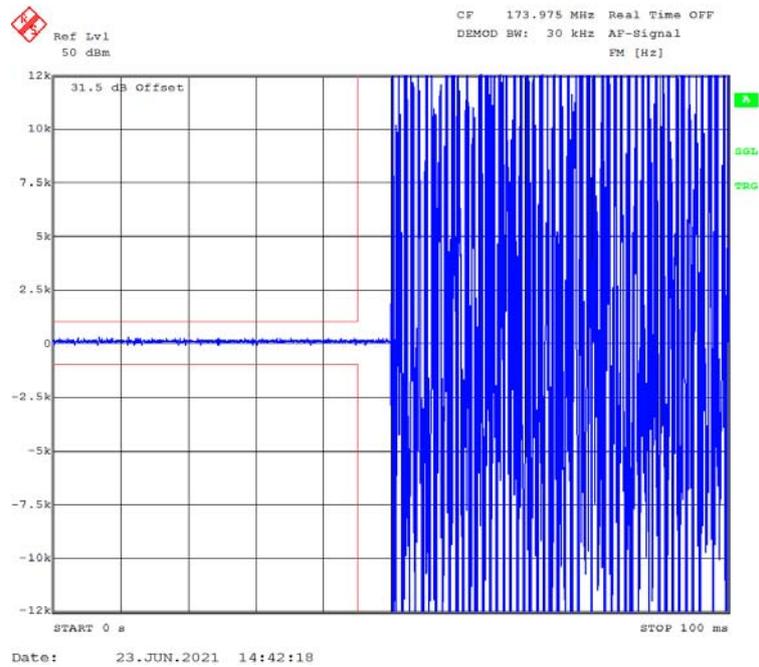
Declarations

1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

3: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

5: This report cannot be reproduced except in full, without prior written approval of the Company.

6: This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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