中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **Tait International Limited**

Address: 245 Wooldridge Road, Harewood, P.O. Box 1645 Christchurch 8051 New Zealand

FCC ID: **CASTPEH7F**

Product Name: **TP3300 Two Way Radio**

Type Code/HVIN: **TPEH7F**

Test Model: **T03-00312-HCDA, T03-00312-HAAA, T03-00312-HBAA**

Standard(s): **47 CFR Part 22**
47 CFR Part 74
47 CFR Part 90
ANSI C63.26-2015
TIA-603-E-2016

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR21120025-00A**

Date Of Issue: **2022-02-16**

Reviewed By: **Sun Zhong** Sun Zhong

Title: Manager

Test Laboratory: China Certification ICT Co., Ltd (Dongguan)
No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China
Tel: +86-769-82016888

Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) 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 a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

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

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CONTENTS

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	TP3300 Two Way Radio
EUT Model:	T03-00312-HCDA, T03-00312-HAAA, T03-00312-HBAA
Multiple Models:	T03-00312-HXXX ("XXX" please refer to DOS)
Operation Frequency:	450-520 MHz
Modulation Type:	FM, 4FSK
Channel Spacing:	12.5 kHz /25 kHz
Rated Output Power: (Conducted)	High Power Level: 4W Low Power Level: 1W
Rated Input Voltage:	DC 7.4V from battery or DC 12V from Charger
Serial Number:	CR21120025-RF-S2(Model: T03-00312-HCDA) CR21120025-RF-S3(Model: T03-00312-HAAA) CR21120025-RF-S4(Model: T03-00312-HBAA)
EUT Received Date:	2021.12.25
EUT Received Status:	Good
Note: The Multiple models are electrically identical with Test model, please refer to the declaration letter for more detail, which was provided by manufacturer. Test was performed at model: T03-00312-HCDA, except radiated emissions test with Model: A/B/C.	

Antenna Information Detail▲:

Antenna	Antenna Manufacturer	Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
1	Tait International Limited	Helical	50	2.5 dBi/450-520MHz
2	Tait International Limited	Helical	50	3.5 dBi/450-520MHz

Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
Adapter	Shenzhen Shi Ying Yuan Electronics Co Ltd	ICP30-120-2000	Input: 100-240V~50/60Hz 0.8A Output: 12V 2A
Charger	Tait International Limited	T03-00322-HAAA	Not Applicable
Headset		T03-00047-BAAA	Not Applicable
Belt Clip		Not Applicable	Not Applicable

Test Frequency Detail:

Per C63.26-2015, section 5.1, the lowest frequency, middle frequency, and highest frequency was performed the test as below:

Modulation/ Channel Bandwidth	Test Channel	Frequency (MHz)	Rule Part
FM 12.5kHz	Lowest	450.0125	For Part 90
	Middle	480.0125	For Part 90
	Highest	519.9875	For Federal
	Additional	454.0125	For Part 22
	Additional	455.0125	For Part 74
4FSK 12.5kHz	Lowest	450.0125	For Part 90
	Middle	480.0125	For Part 90
	Highest	519.9875	For Federal
	Additional	454.0125	For Part 22
	Additional	455.0125	For Part 74
FM 25kHz	Additional	454.0125	For Part 22
	Additional	455.0125	For Part 74

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Engineering Mode, which was provided by the manufacturer.
Equipment Modifications:	No
EUT Exercise Software:	No

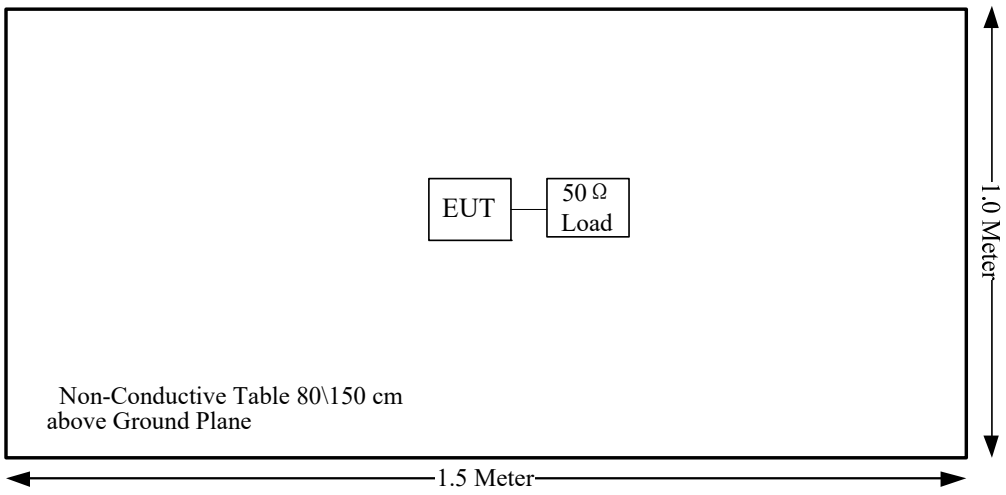
1.2.2 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
WEINSCHEL Corp	Load	50oml	50oml Load

1.2.3 Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
\	\	\	\	\	\

1.2.4 Block Diagram of Test Setup



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Unwanted Emissions, conducted	±1.26 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
RF Frequency	$\pm 0.082\times10^{-6}$

2. SUMMARY OF TEST RESULTS

Standard(s)/Rule(s)	Description of Test	Results
§2.1046; § 22.727; §74.461; §90.205	RF Output Power	Compliant
§2.1047	Modulation Characteristic	Compliant
§2.1049;§22.357;§ 22.731; §74.462;§90.209; §90.210	Occupied Bandwidth & Emission Mask	Compliant
§2.1051; §22.861; §74.462; §90.210	Spurious Emission at Antenna Terminal	Compliant
§2.1053;§22.861; §74.462;§90.210	Spurious Radiated Emissions	Compliant
§2.1055; § 22.355; §74.464; §90.213	Frequency Stability	Compliant
§90.214	Transient Frequency Behavior	Compliant

3. REQUIREMENTS AND TEST PROCEDURES

3.1 RF OUTPUT POWER

3.1.1 Applicable Standard

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

3.1.2 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:

R B/W	Video B/W
100 kHz	300 kHz

3.2 MODULATION CHARACTERISTIC:

3.2.1 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.

3.2.2 Test Procedure

Test Method: TIA-603-E 2.2.3

3.3 OCCUPIED BANDWIDTH & EMISSION MASK:

3.3.1 Applicable Standard

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

3.3.2Test 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.

3.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS:

3.4.1 Applicable Standard

FCC §2.1051, §22.861, §74.462, and §90.210

3.4.2Test 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 100kHz for below 1GHz, and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

3.5 RADIATED SPURIOUS EMISSIONS:

3.5.1 Applicable Standard

FCC §2.1053, §22.861, §74.462, and §90.210

3.5.2 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

3.6 FREQUENCY STABILITY:

3.6.1 Applicable Standard

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

3.6.2Test Procedure

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

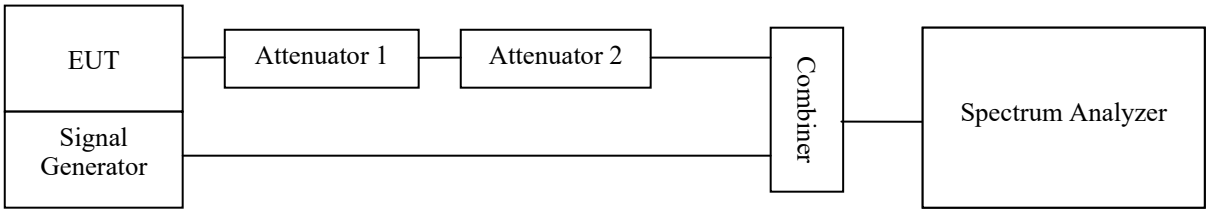
3.7 TRANSIENT FREQUENCY BEHAVIOR

3.7.1 Applicable Standard

Regulations: FCC §90.214

3.7.2 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 ±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 P_0.
f) Turn off the transmitter.
g) Adjust the RF level of the signal generator to provide RF power equal to P_0. This signal generator RF level shall be maintained throughout the rest of the measurement.
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 t_{on}. The trace should be maintained within the allowed divisions during the period t_1 and t_2.
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 t_3.



4. Test DATA AND RESULTS

4.1 RF OUTPUT POWER

Serial Number:	CR21120025-RF-S2	Test Date:	2022-01-13~2022-02-15
Test Site:	RF	Test Mode:	Transmitting
Tester:	Morpheus Shi	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.3~21.4	Relative Humidity: (%)	44~51	ATM Pressure: (kPa)	101.4~101.7

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2021-07-22	2022-07-21
YINSAIGE	Coaxial Cable	SS402	SJ0100004	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100003	Each time	N/A
Weinschel	Power splitter	1515	RA915	Each time	N/A
HP	RF Communications Test Set	8920A	3438A05209	2021-07-22	2022-07-21

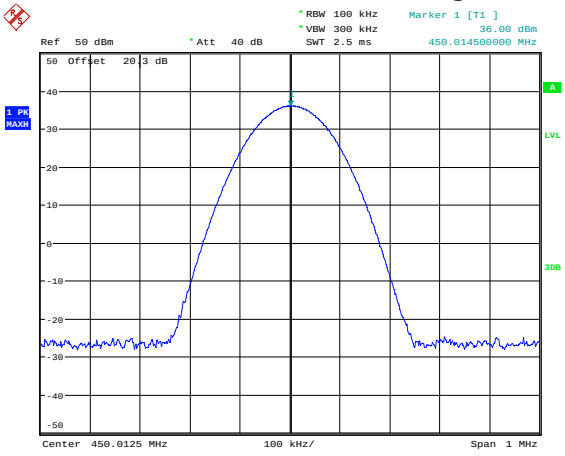
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Channel Separation	Test Modulation	Test Channel	Test Frequency (MHz)	Conducted Output Power (dBm)		Limit (dBm)	
				High Power Level	Low Power Level	High Power Level	Low Power Level
12.5kHz	FM	Low	450.0125	36.00	30.55	36.81	30.79
		Middle	480.0125	36.16	29.94	36.81	30.79
		High	519.9875	36.21	30.31	36.81	30.79
		Additional	455.0125	35.92	30.25	36.81	30.79
		Additional	454.0125	35.98	30.33	36.81	30.79
	4FSK	Low	450.0125	36.11	30.26	36.81	30.79
		Middle	480.0125	36.30	30.45	36.81	30.79
		High	519.9875	36.37	30.45	36.81	30.79
		Additional	455.0125	36.00	30.07	36.81	30.79
		Additional	454.0125	36.05	30.11	36.81	30.79
25kHz	FM	Additional	455.0125	35.93	30.30	36.81	30.79
		Additional	454.0125	35.98	30.34	36.81	30.79

Note:
The high rated power level is 4W(36dBm), and low rated power level is 1W(30dBm).
The output power shall not exceed by more than 20 percent the manufacturer's rated output power for the particular transmitter specifically listed on the authorization.

FM, 12.5kHz:

Low Channel, 450.0125 MHz High Power



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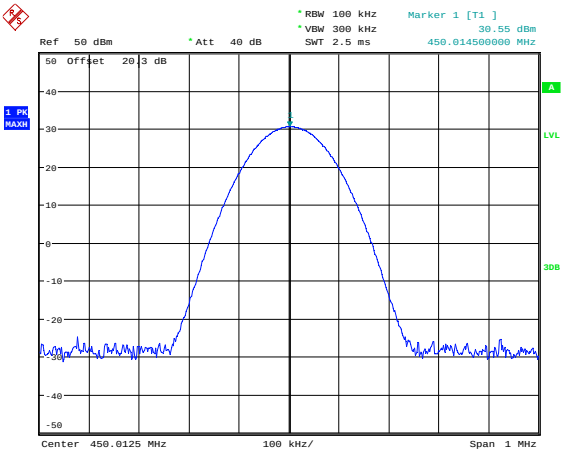
Low Channel,450.0125 MHz Low Power



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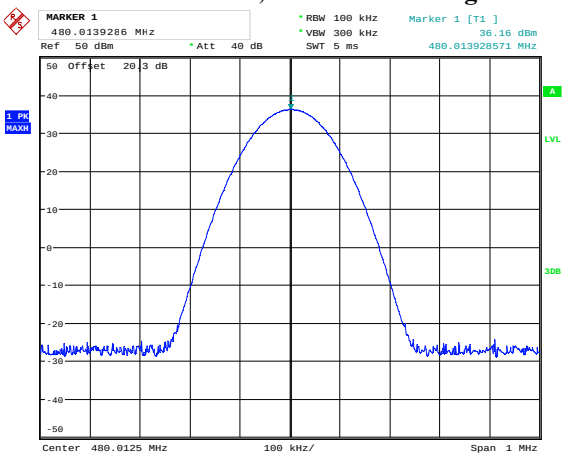
Middle Channel,480.0125 MHz High Power



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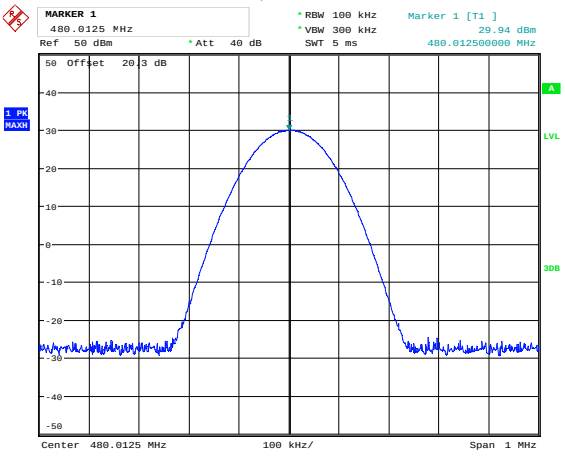
Middle Channel,480.0125 MHz Low Power



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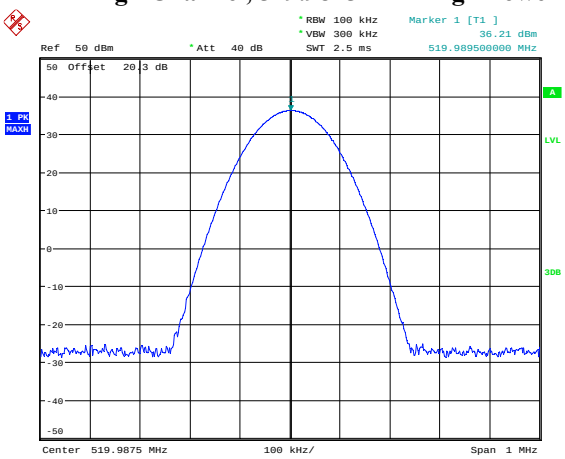
High Channel, 519.9875MHz High Power



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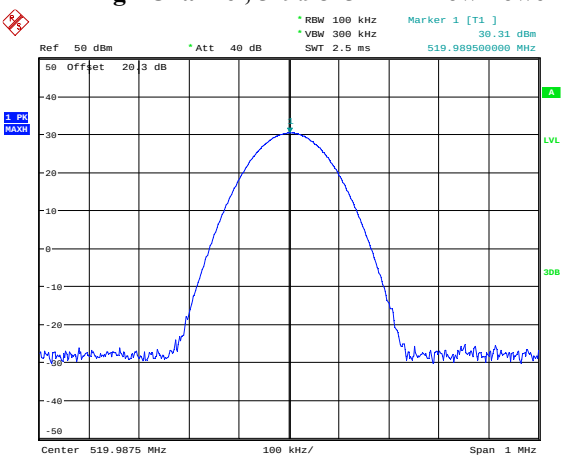
High Channel, 519.9875 MHz Low Power



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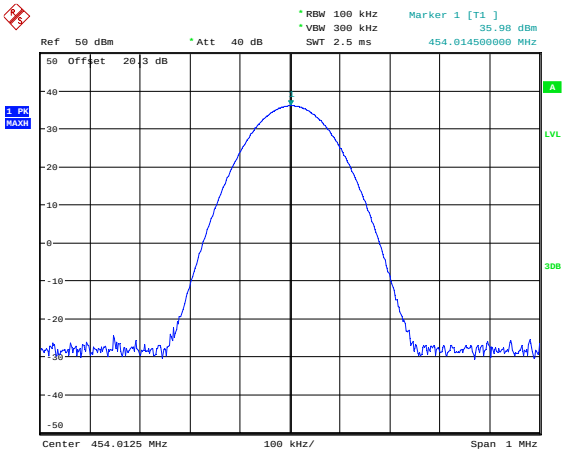
Additional, For Part 22, 454.0125 MHz High Power



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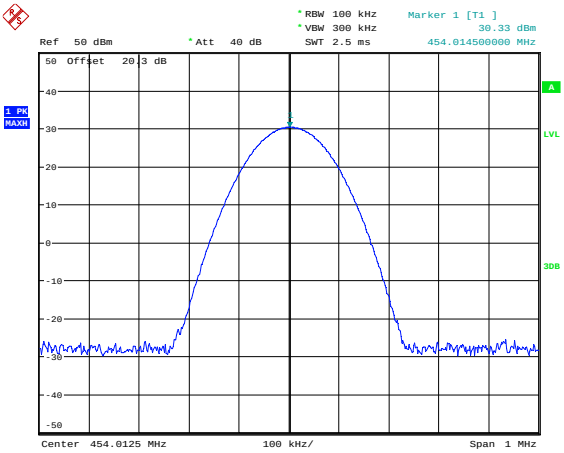

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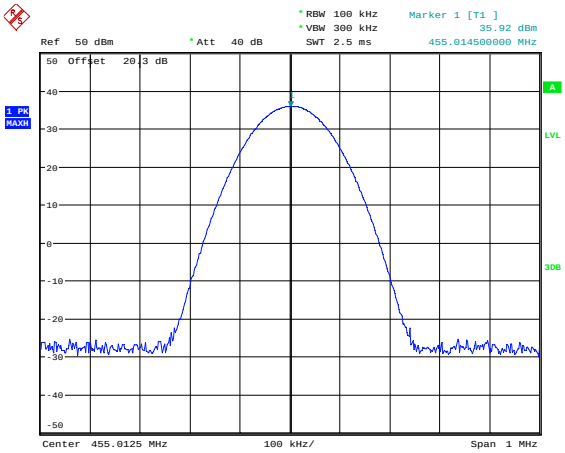
Additional, For Part 74, 455.0125 MHz High Power



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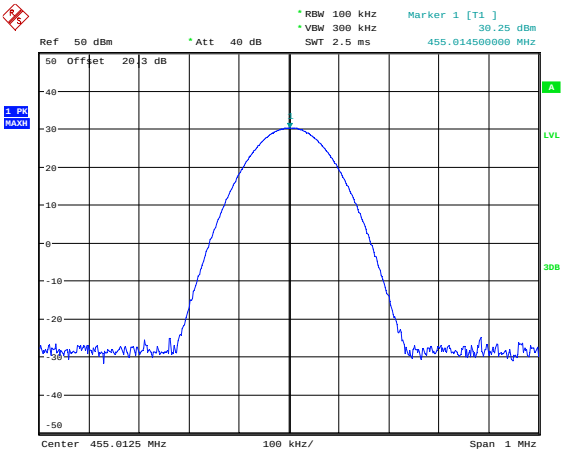

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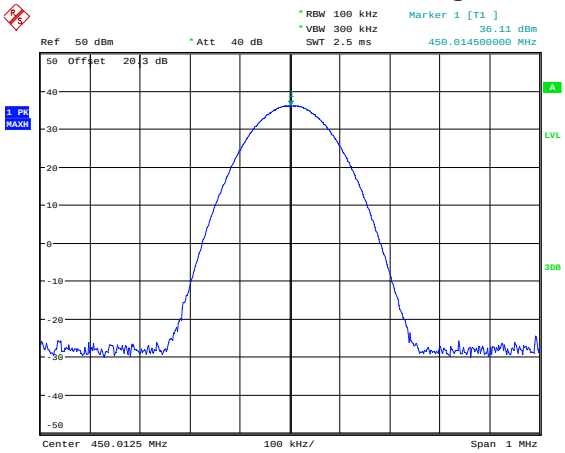
4FSK, 12.5kHz:

Low Channel, 450.0125 MHz High Power



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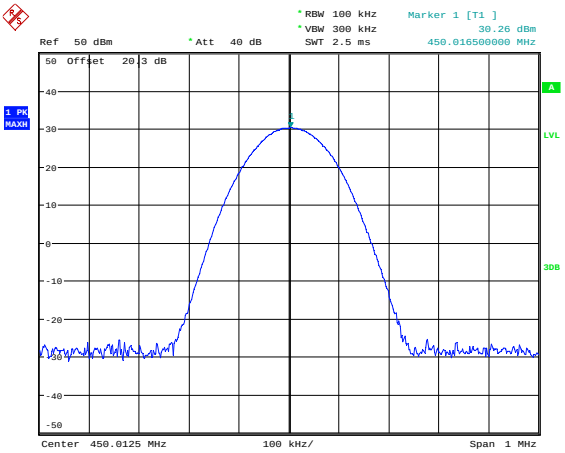
Low Channel,450.0125 MHz Low Power



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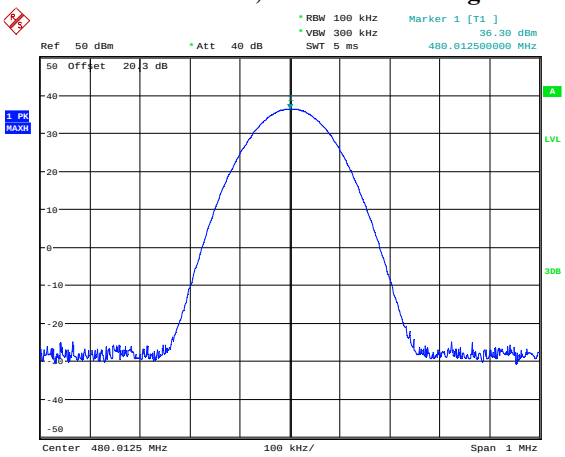
Middle Channel, 480.0125 MHz High Power



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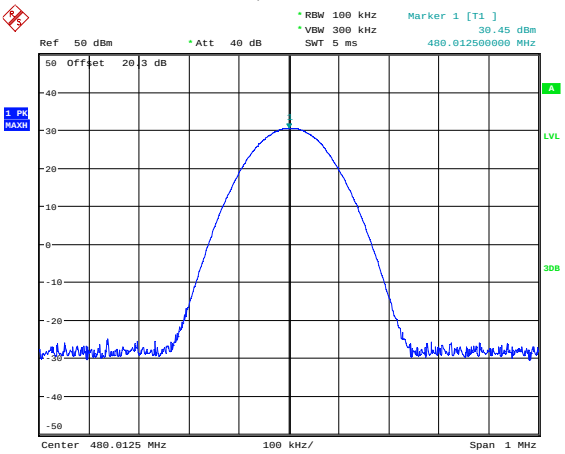
Middle Channel, 480.0125 MHz Low Power



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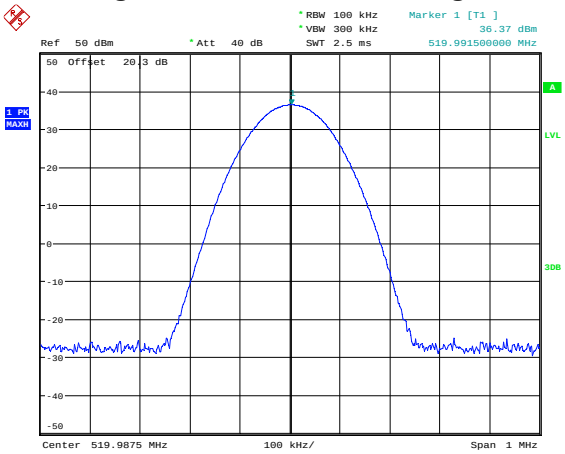
High Channel, 519.9875MHz High Power



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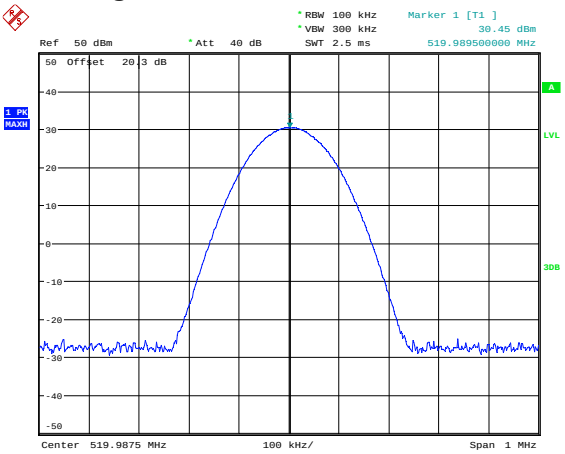
High Channel, 519.9875 MHz Low Power



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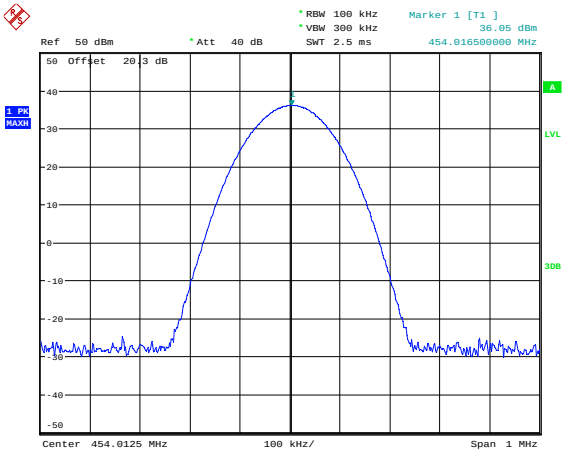
Additional, For Part 22, 454.0125 MHz High Power



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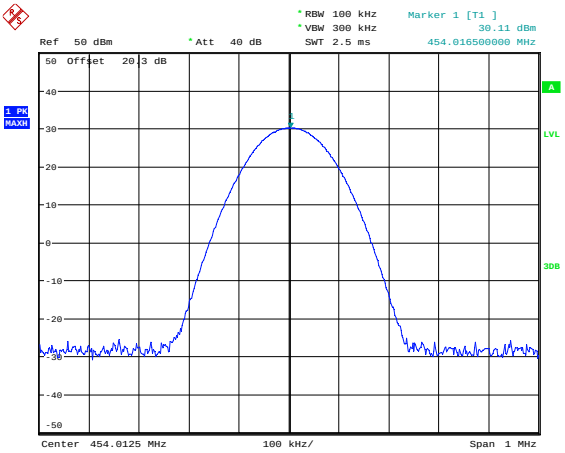

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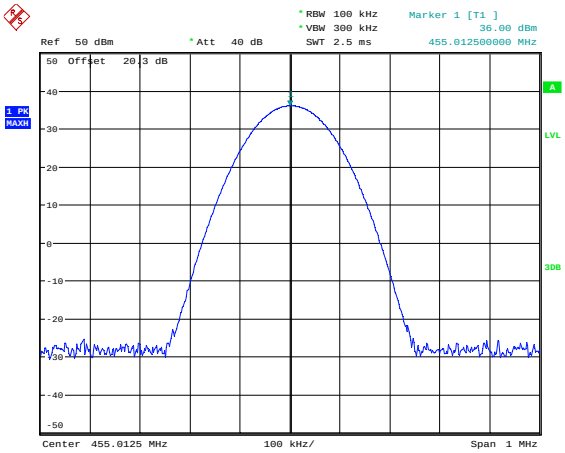
Additional, For Part 74, 455.0125 MHz High Power



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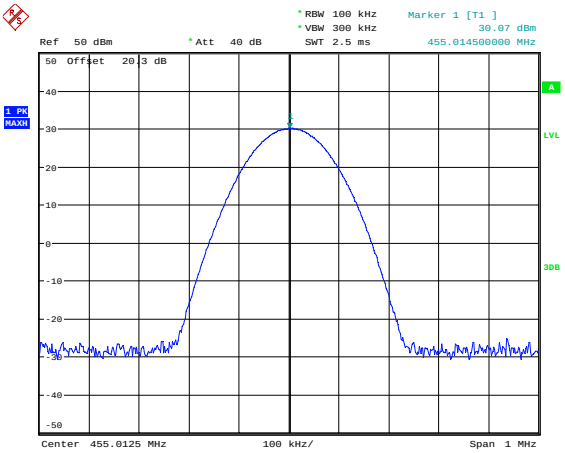

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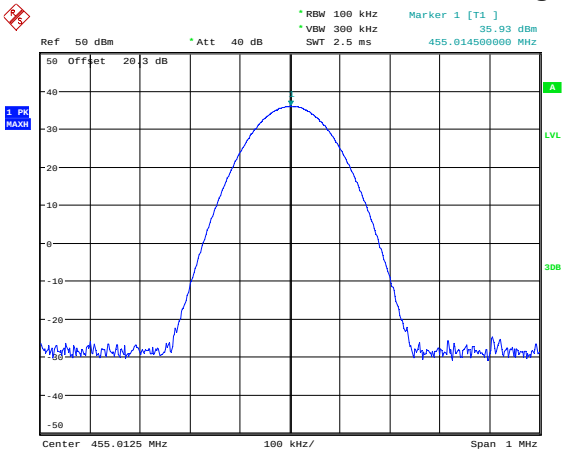
FM, 25kHz:

Additional Channel, Part 74, 455.0125 MHz High Power



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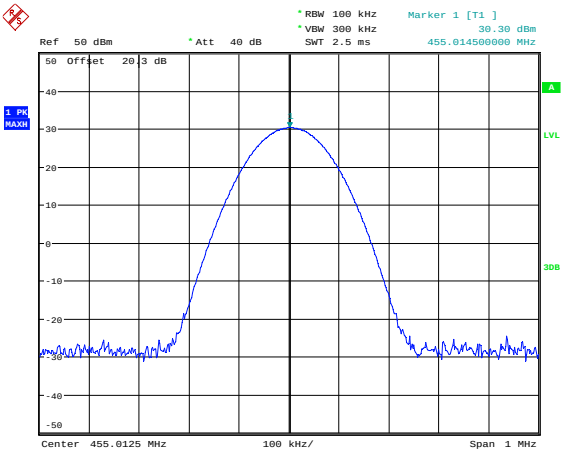
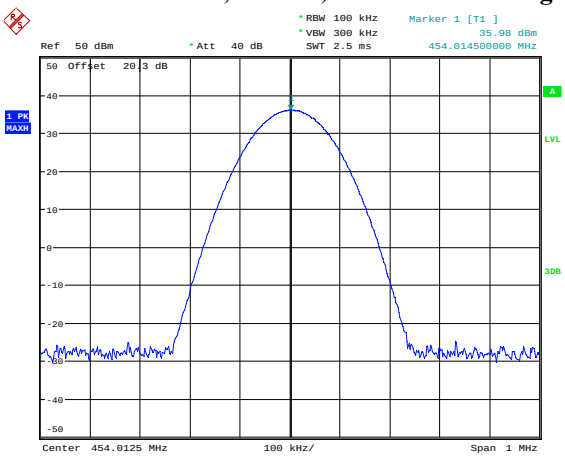
Additional Channel, Part 74, 455.0125 MHz Low Power



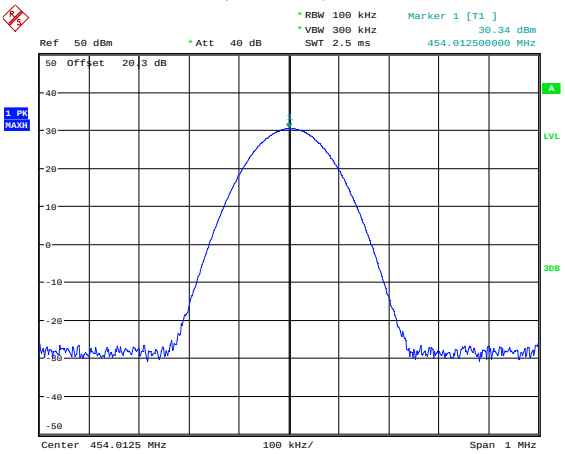
Date: 13.JAN.2022 13:23:22

Additional Channel, Part 22, 454.0125 MHz High Power



Date: 13.JAN.2022 13:24:44

Additional Channel, Part 22, 454.0125 MHz Low Power



Date: 13.JAN.2022 13:25:01

4.2 MODULATION CHARACTERISTIC:

Serial Number:	CR21120025-RF-S2	Test Date:	2022-01-13
Test Site:	RF	Test Mode:	Transmitting
Tester:	Morpheus Shi	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.3	Relative Humidity: (%)	44	ATM Pressure: (kPa)	101.7

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
YINSAIGE	Coaxial Cable	SS402	SJ0100004	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
HP	RF Communications Test Set	8920A	3438A05209	2021-07-22	2022-07-21

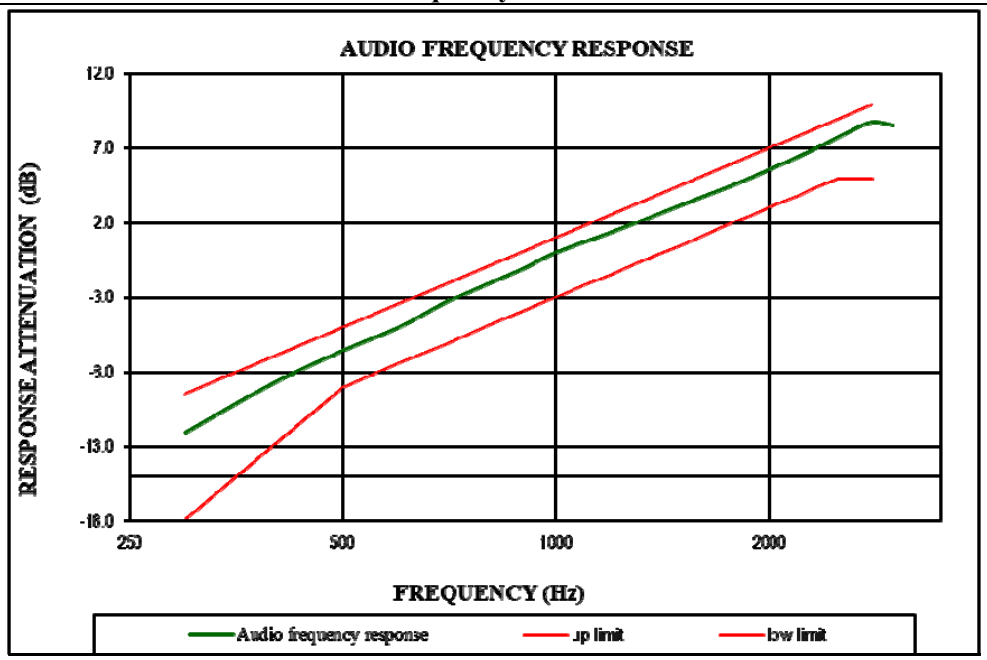
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Audio Frequency Response – High Power

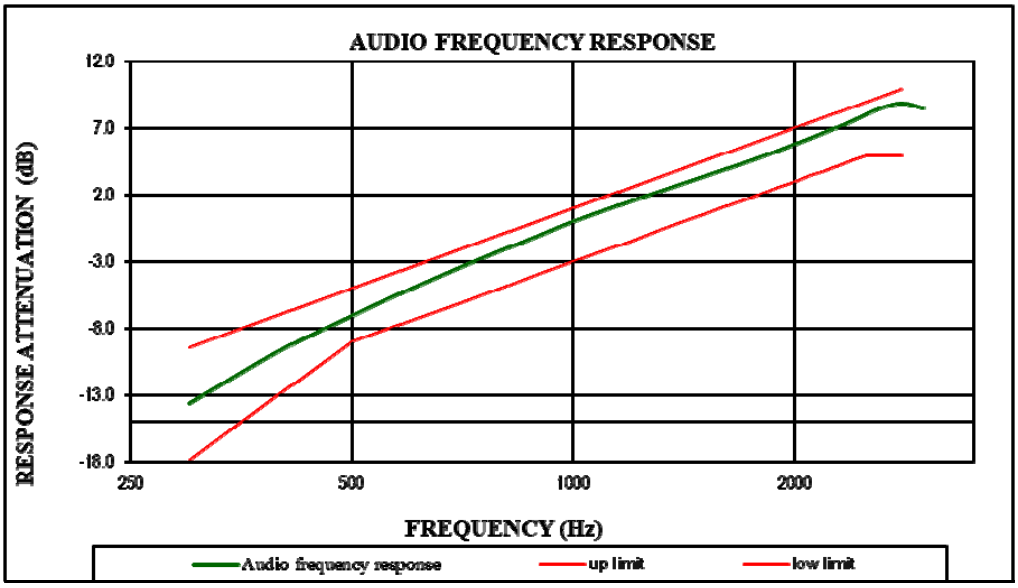
Channel Spacing: 12.5kHz	
Modulation Frequency (Hz)	**Response data (dB)**
300	-12.04
400	-8.72
500	-6.57
600	-5.01
700	-3.33
800	-2.11
900	-1.08
1000	0.00
1200	1.37
1400	2.60
1600	3.68
1800	4.60
2000	5.55
2200	6.41
2400	7.28
2600	8.11
2800	8.74
3000	8.52

Carrier Frequency: 480.0125 MHz



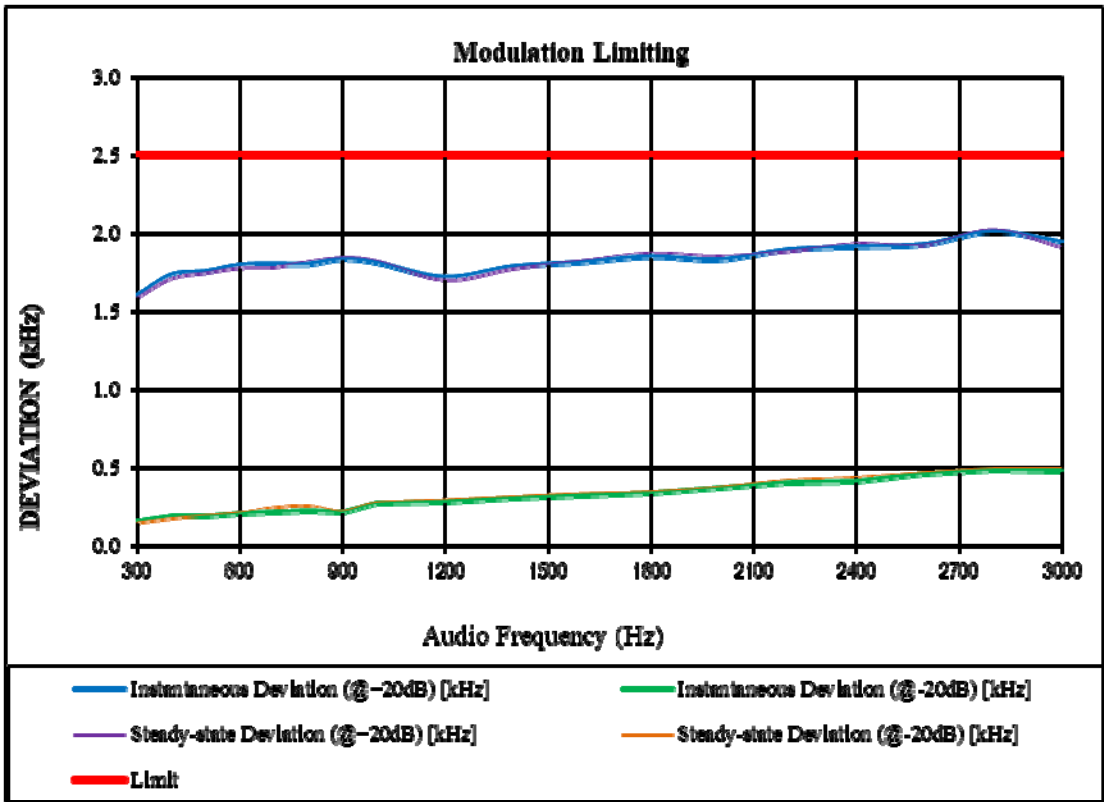
Channel Spacing: 25kHz	
Modulation Frequency (Hz)	**Response data (dB)**
300	-13.61
400	-9.63
500	-7.06
600	-5.05
700	-3.46
800	-2.15
900	-1.02
1000	0.00
1200	1.54
1400	2.79
1600	3.86
1800	4.83
2000	5.77
2200	6.66
2400	7.55
2600	8.42
2800	8.85
3000	8.48

Carrier Frequency: 455.0125 MHz



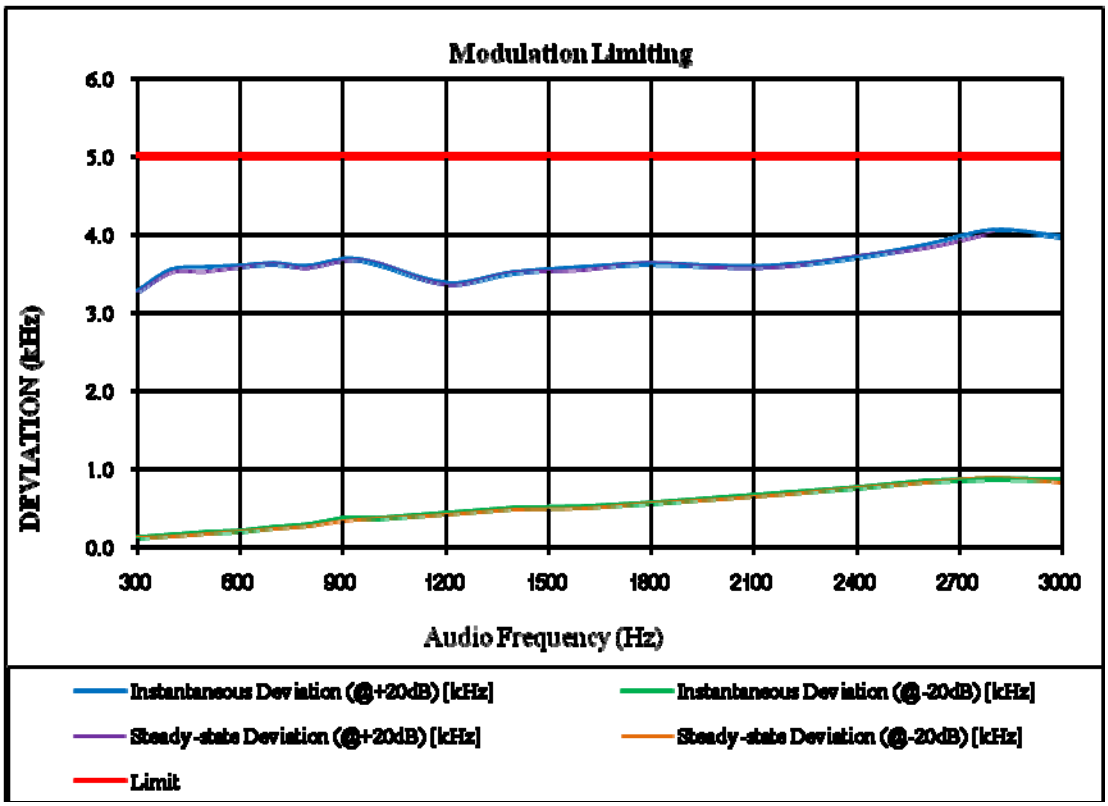
Modulation Limiting – High Power

Channel Spacing: 12.5kHz	Carrier Frequency: 480.0125 MHz				
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	1.602	0.155	1.586	0.145	2.5
400	1.735	0.188	1.711	0.174	2.5
500	1.757	0.192	1.746	0.195	2.5
600	1.798	0.206	1.778	0.212	2.5
700	1.805	0.218	1.782	0.246	2.5
800	1.803	0.223	1.821	0.258	2.5
900	1.836	0.218	1.845	0.221	2.5
1000	1.813	0.269	1.825	0.274	2.5
1200	1.720	0.281	1.701	0.294	2.5
1400	1.789	0.302	1.774	0.315	2.5
1600	1.816	0.324	1.826	0.335	2.5
1800	1.851	0.335	1.874	0.346	2.5
2000	1.832	0.367	1.856	0.374	2.5
2200	1.896	0.406	1.884	0.421	2.5
2400	1.914	0.415	1.936	0.438	2.5
2600	1.930	0.458	1.925	0.469	2.5
2800	2.012	0.486	2.025	0.494	2.5
3000	1.944	0.480	1.912	0.494	2.5



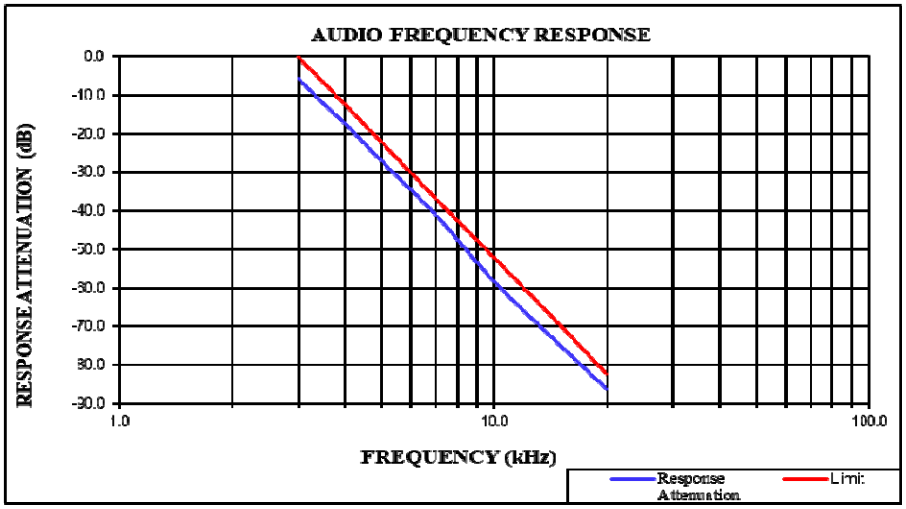
Modulation Limiting – High Power

Channel Spacing: 25kHz	Carrier Frequency: 455.0125 MHz				
Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	Deviation (@+20dB) [kHz]	Deviation (@-20dB) [kHz]	
300	3.265	0.120	3.245	0.118	5
400	3.549	0.147	3.516	0.136	5
500	3.575	0.182	3.525	0.175	5
600	3.601	0.205	3.584	0.201	5
700	3.621	0.244	3.633	0.237	5
800	3.594	0.284	3.574	0.274	5
900	3.681	0.357	3.664	0.334	5
1000	3.635	0.367	3.645	0.368	5
1200	3.374	0.436	3.362	0.411	5
1400	3.506	0.489	3.512	0.475	5
1600	3.572	0.509	3.544	0.492	5
1800	3.627	0.570	3.637	0.554	5
2000	3.592	0.622	3.578	0.610	5
2200	3.603	0.690	3.588	0.678	5
2400	3.713	0.764	3.725	0.751	5
2600	3.864	0.848	3.825	0.825	5
2800	4.052	0.876	4.026	0.894	5
3000	3.972	0.855	3.925	0.822	5

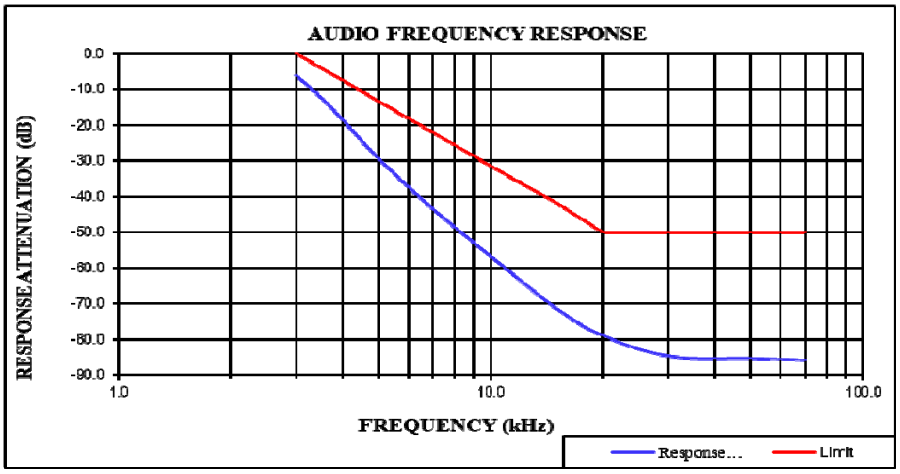


Audio Frequency Low Pass Filter Response – High Power

Channel Spacing: 12.5kHz		
Carrier Frequency: 480.0125 MHz		
Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
3.0	-5.7	0.0
3.5	-12.2	-6.7
4.0	-17.4	-12.5
5.0	-27.1	-22.2
7.0	-41.2	-36.8
10.0	-58.4	-52.3
15.0	-74.9	-69.9
20.0	-86.3	-82.5



Channel Spacing: 25kHz		
Carrier Frequency: 455.0125 MHz		
Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
3.0	-6.1	0.0
3.5	-12.3	-4.0
4.0	-18.5	-7.5
5.0	-29.4	-13.3
7.0	-43.5	-22.1
10.0	-56.7	-31.4
15.0	-71.3	-41.9
20.0	-78.9	-50.0
30.0	-84.6	-50.0
50.0	-85.2	-50.0
70.0	-85.7	-50.0



4.3 OCCUPIED BANDWIDTH & EMISSION MASK:

Serial Number:	CR21120025-RF-S2	Test Date:	2022-01-13~2022-02-15
Test Site:	RF	Test Mode:	Transmitting
Tester:	Morpheus Shi	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.3~21.4	Relative Humidity: (%)	44~51	ATM Pressure: (kPa)	101.4~101.7

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2021-07-22	2022-07-21
YINSAIGE	Coaxial Cable	SS402	SJ0100004	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100003	Each time	N/A
Weinschel	Power splitter	1515	RA915	Each time	N/A
HP	RF Communications Test Set	8920A	3438A05209	2021-07-22	2022-07-21

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Mode	Test Channel	Test Frequency (MHz)	High Power Level		Low Power Level	
			99% Occupied Bandwidth (kHz)	26dB Emission Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	26dB Emission Bandwidth (kHz)
FM 12.5kHz	Low	450.0125	5.300	10.240	5.300	10.240
	Middle	480.0125	5.286	10.258	5.214	10.266
	High	519.9875	5.300	10.240	5.300	10.240
	Additional	454.0125	5.200	10.240	5.300	10.240
	Additional	455.0125	5.200	10.240	5.200	10.240
4FSK 12.5kHz	Low	450.0125	6.100	8.237	6.500	9.079
	Middle	480.0125	6.357	8.192	6.214	8.699
	High	519.9875	6.400	8.557	6.000	8.199
	Additional	454.0125	6.600	9.199	6.300	8.899
	Additional	455.0125	6.200	8.640	6.300	9.160
FM 25kHz	Additional	454.0125	10.800	15.994	10.800	15.994
	Additional	455.0125	10.800	16.086	10.800	16.086

Note: Emission bandwidth was based on calculation method instead of measurement.
Emission Designator: Per CFR 47 §2.201& §2.202, BW = 2M + 2D

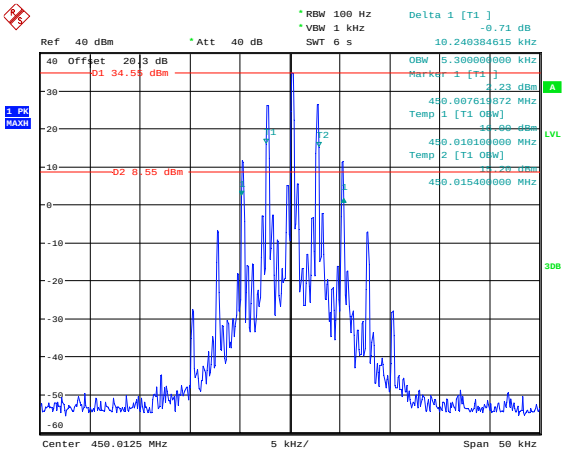
For FM Mode (Channel Spacing: 12.5 kHz)
Emission Designator: 11K0F3E
In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz = 11K0
F3E portion of the designator represents an FM voice transmission
Therefore, the entire designator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

FM, 12.5kHz, High Power:

Low Channel



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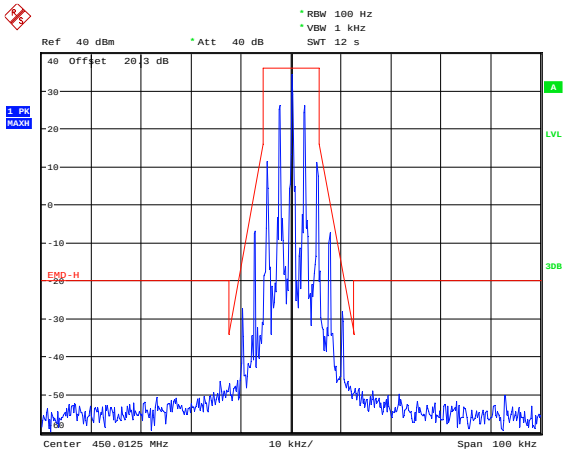

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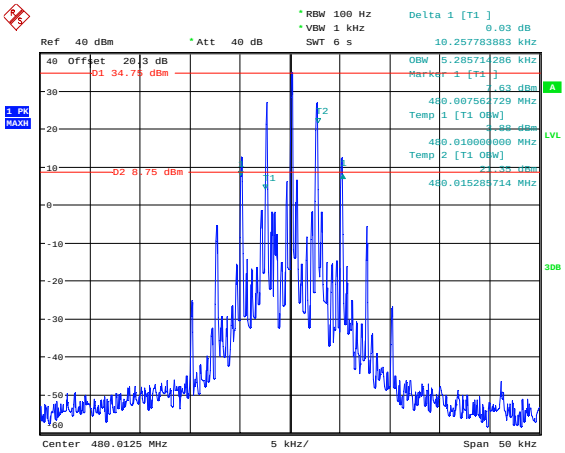
Middle Channel



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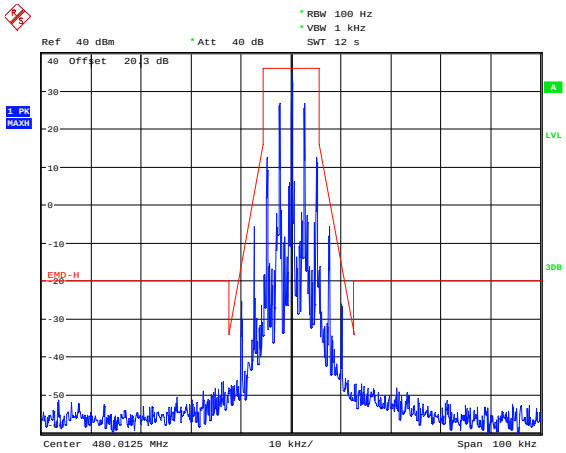

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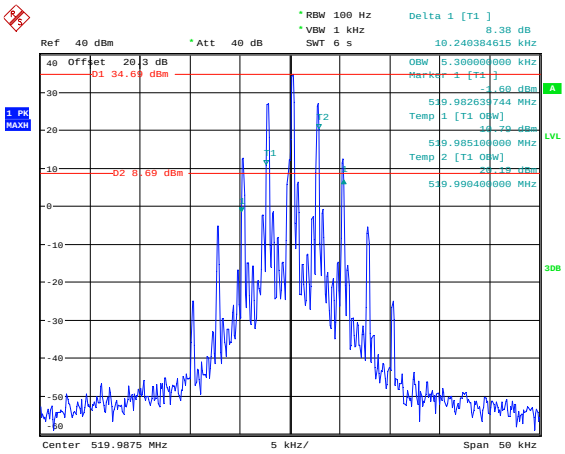
High Channel



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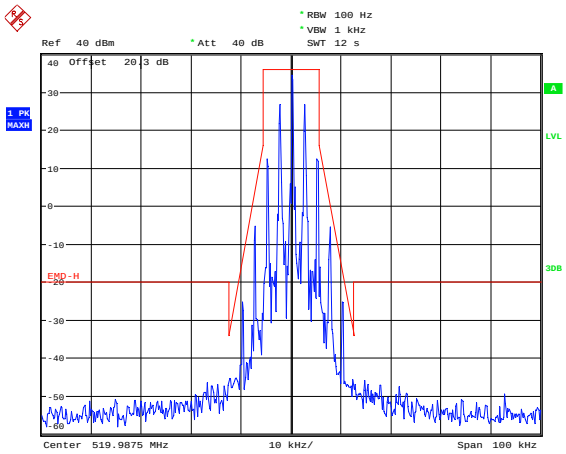

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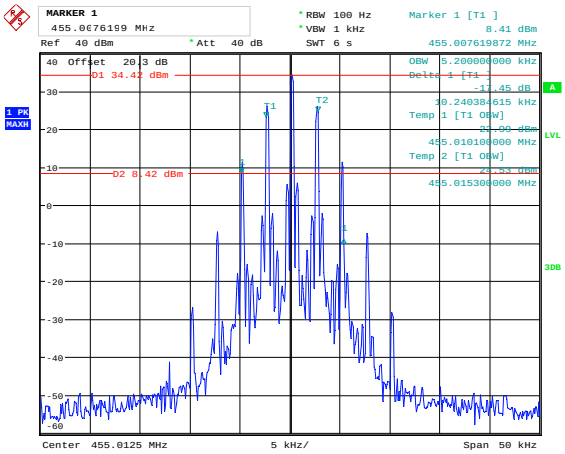
Additional Channel Part 74, 455.0125 MHz



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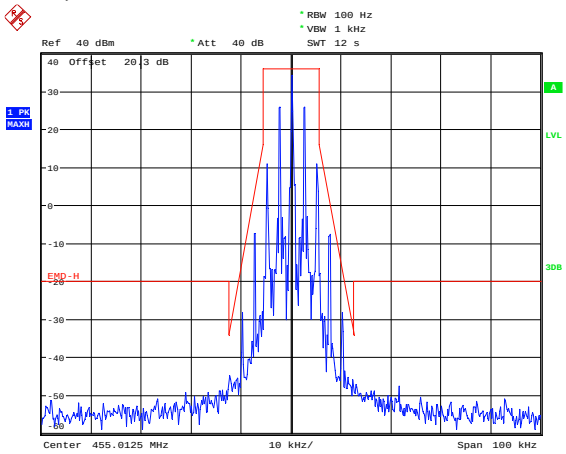

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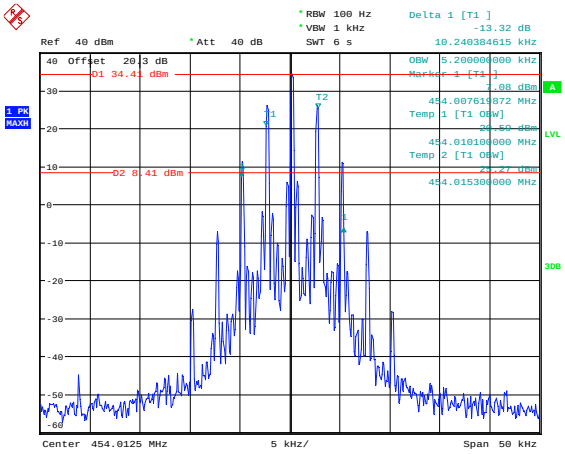
Additional Channel Part 22, 454.0125 MHz



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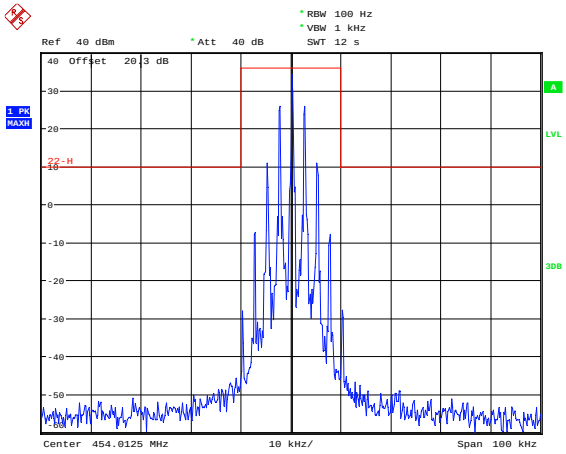

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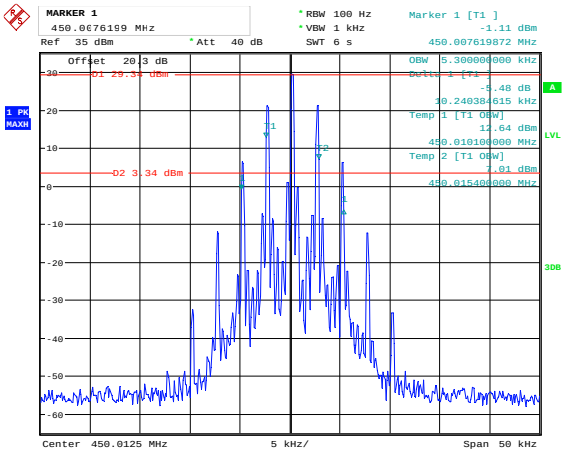
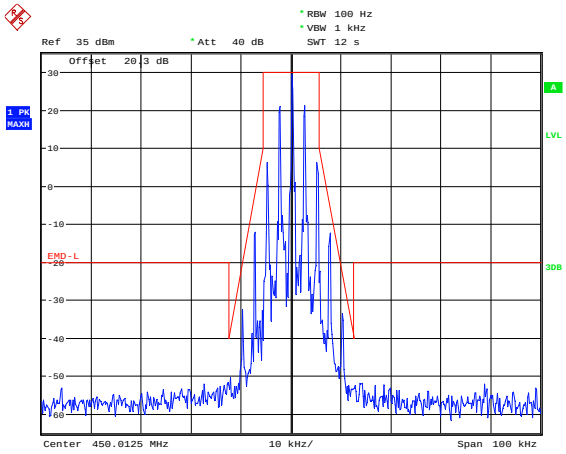
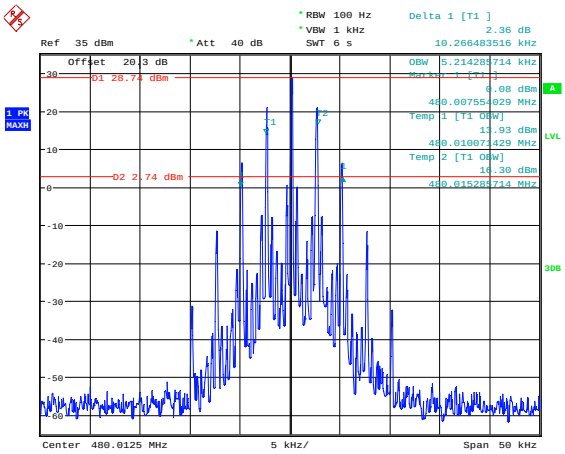
FM, 12.5kHz, Low Power:

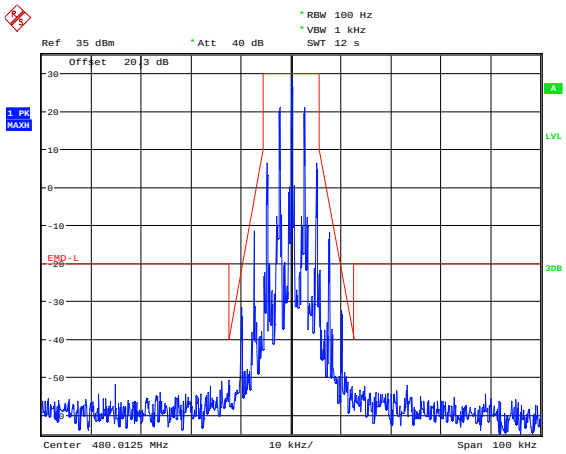
Low Channel



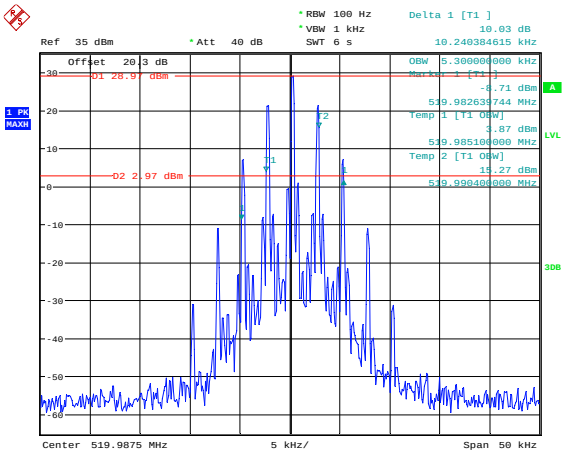


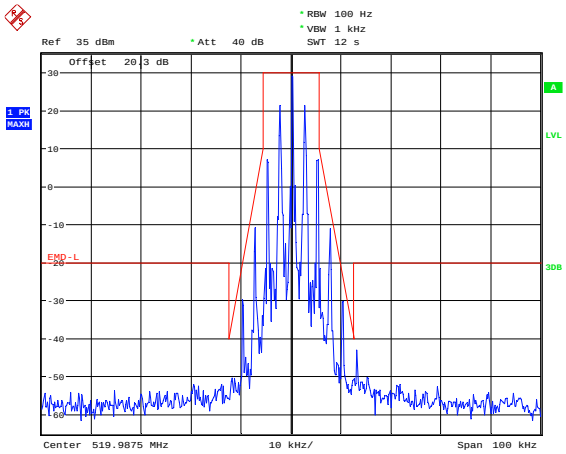
Middle Channel



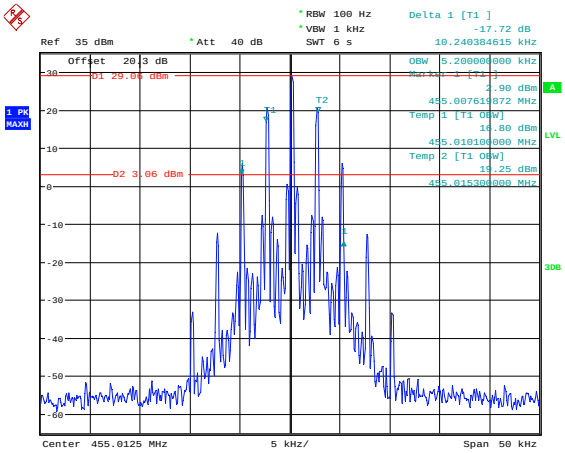


High Channel





Additional Channel Part 74, 455.0125 MHz



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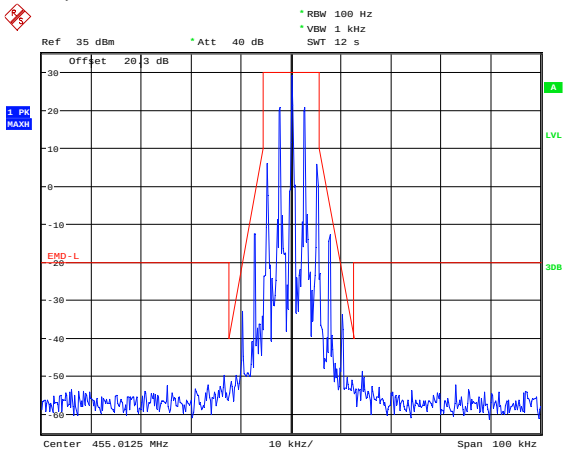

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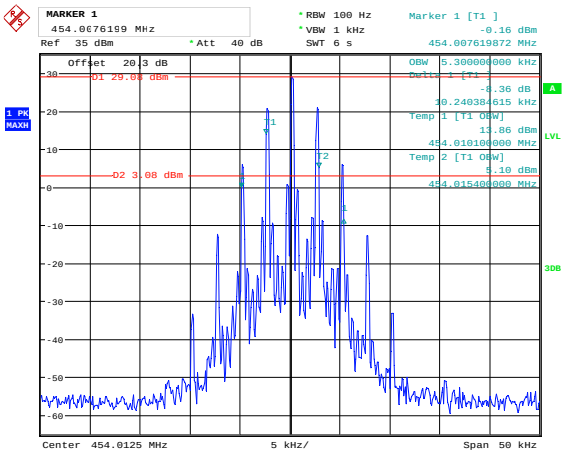
Additional Channel Part 22, 454.0125 MHz



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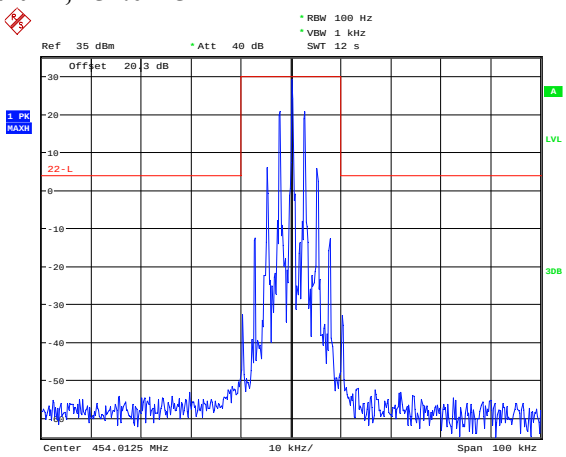

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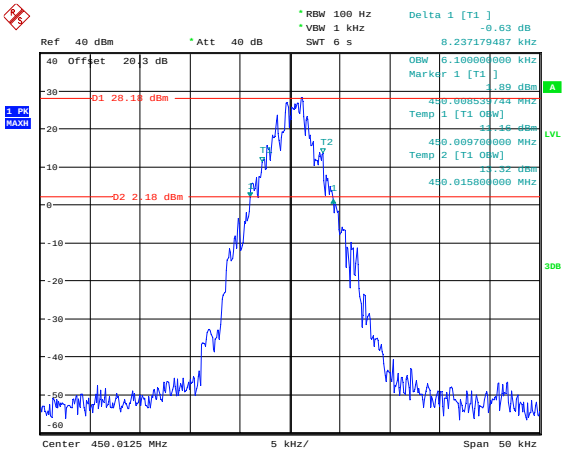
4FSK, 12.5kHz, High Power:

Low Channel



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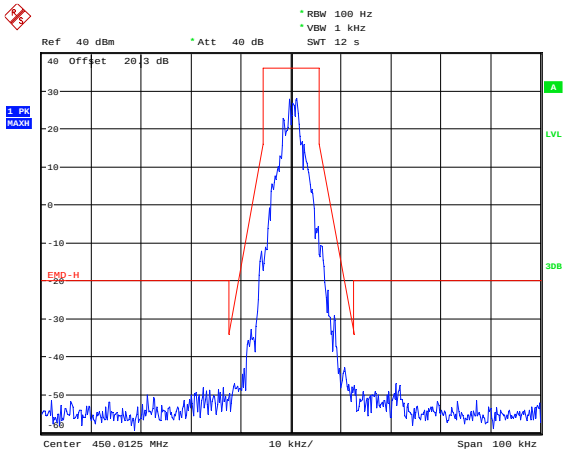

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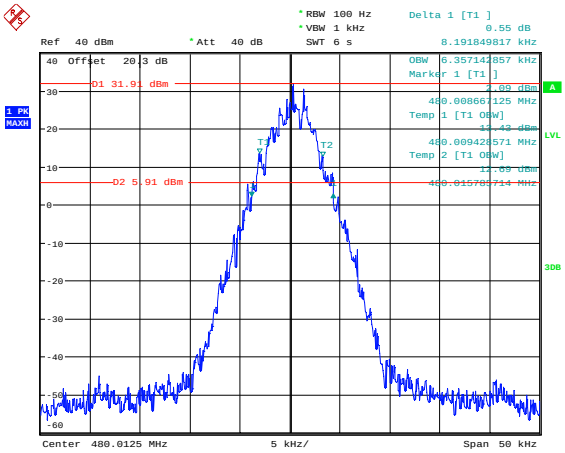
Middle Channel



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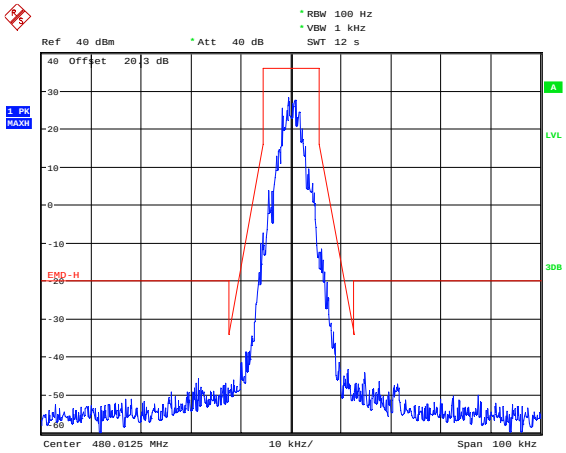

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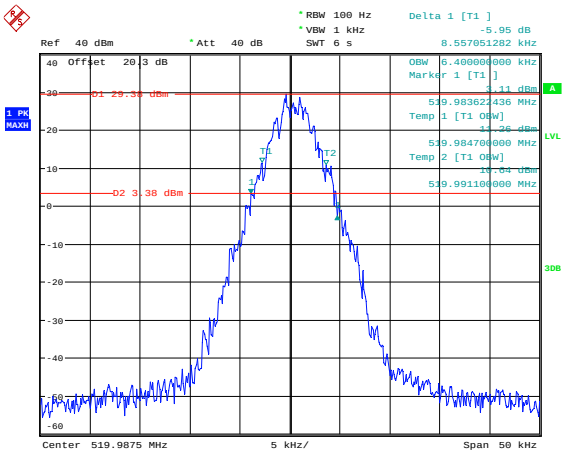
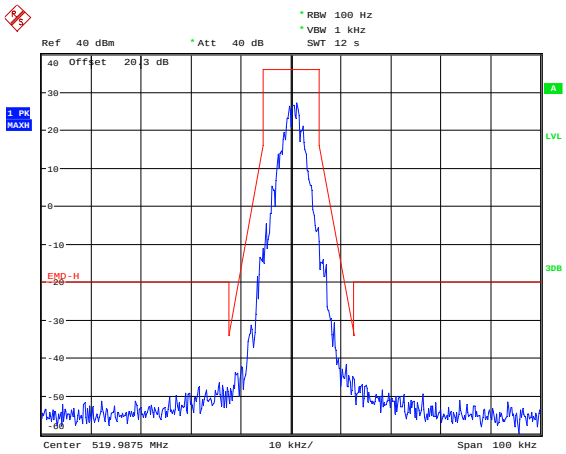
High Channel

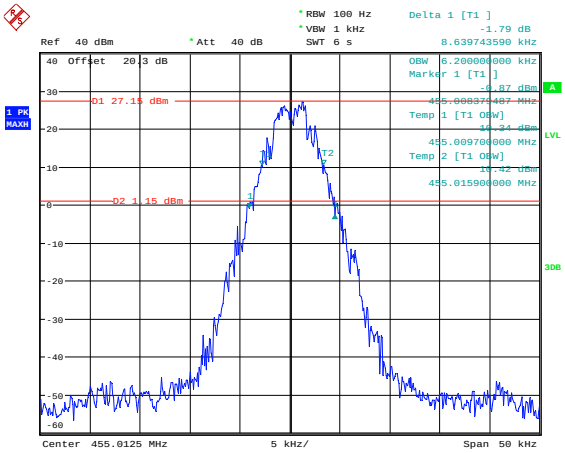


Date: 13.JAN.2022 15:31:10

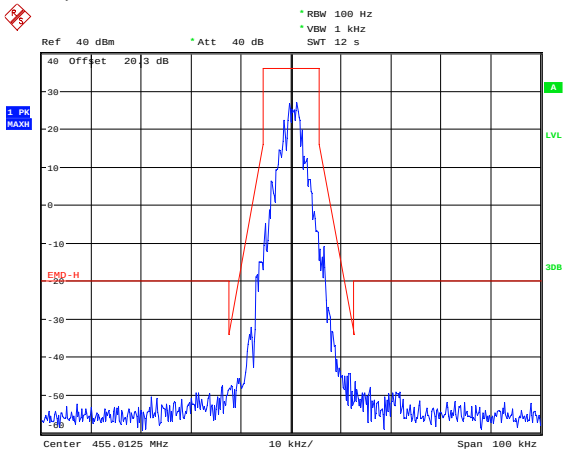


Date: 13.JAN.2022 16:25:59

Additional Channel Part 74, 455.0125 MHz

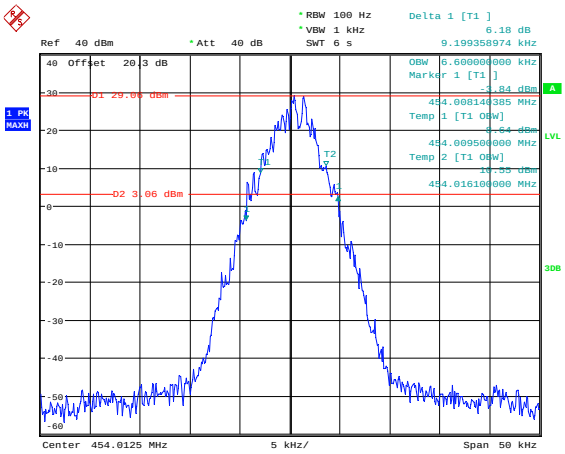


Date: 13.JAN.2022 15:37:17

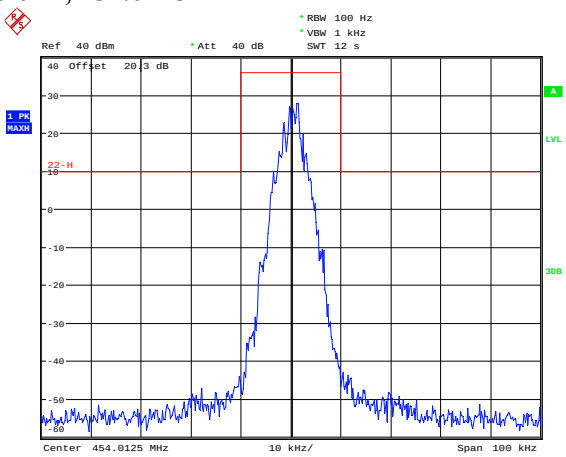


Date: 13.JAN.2022 16:29:58

Additional Channel Part 22, 454.0125 MHz



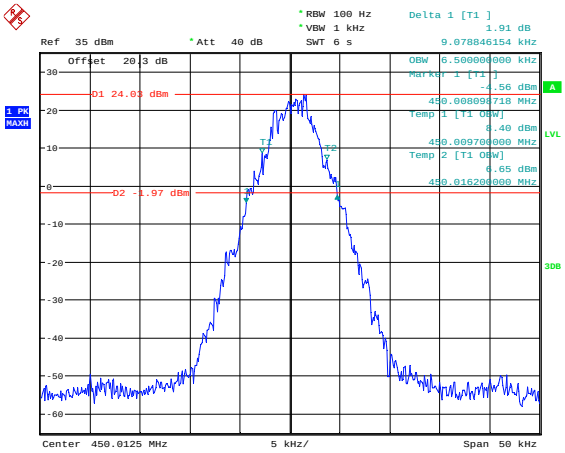
Date: 13.JAN.2022 15:42:45



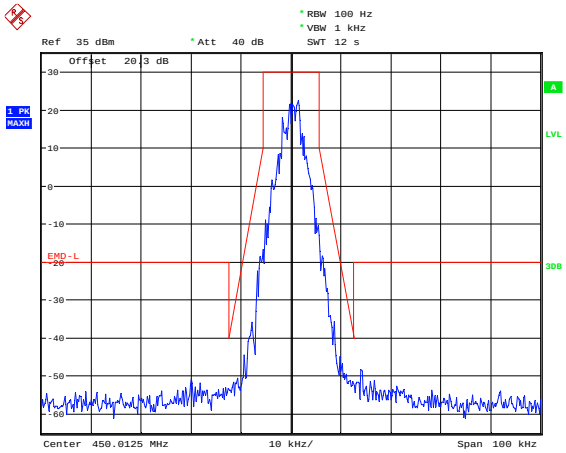
Date: 13.JAN.2022 16:31:59

4FSK, 12.5kHz, Low Power:

Low Channel

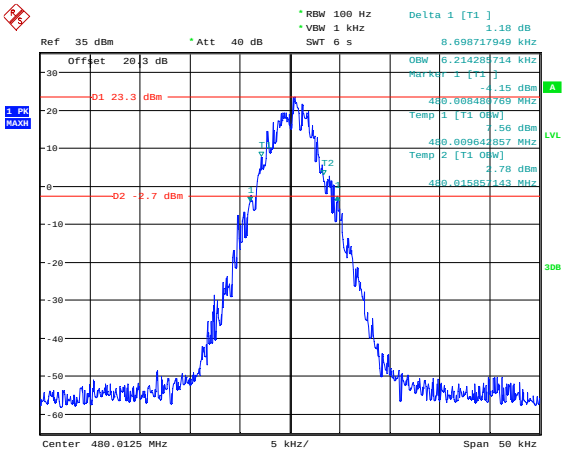


Date: 13.JAN.2022 15:19:56

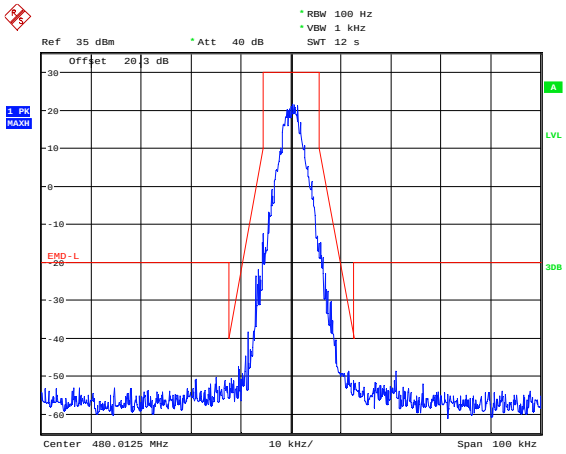


Date: 13.JAN.2022 16:20:26

Middle Channel

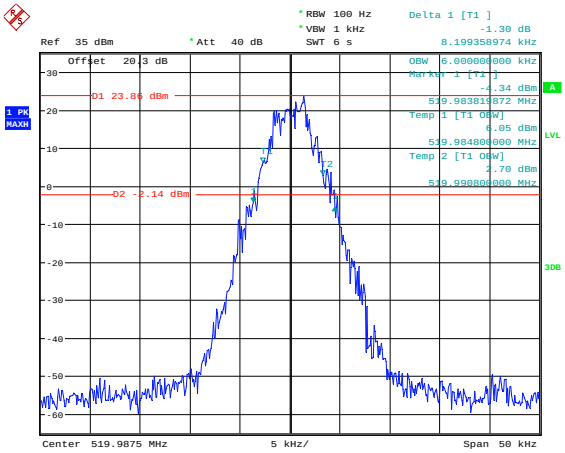


Date: 15.FEB.2022 16:31:18

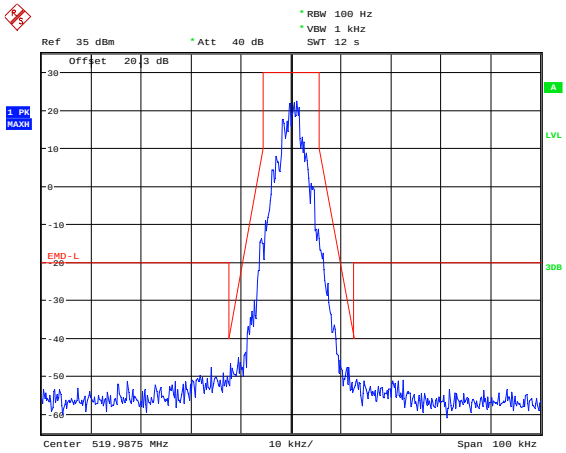


Date: 15.FEB.2022 16:37:42

High Channel

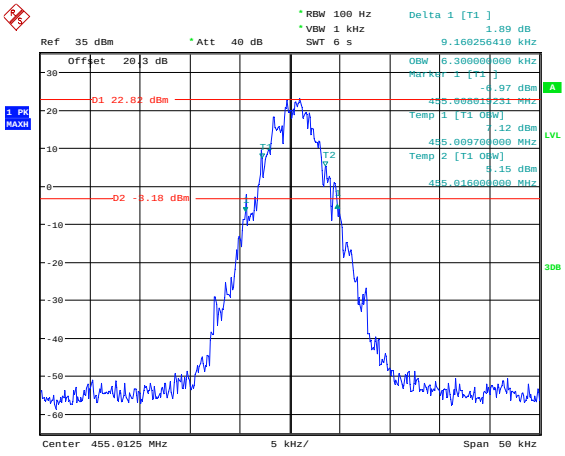


Date: 13.JAN.2022 15:33:16

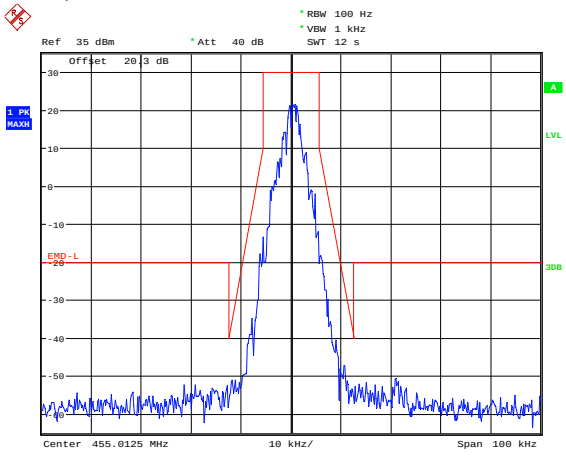


Date: 13.JAN.2022 16:27:24

Additional Channel Part 74, 455.0125 MHz

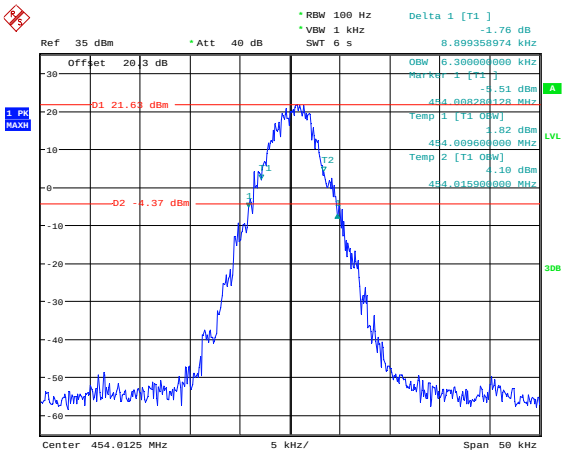


Date: 13.JAN.2022 15:40:15

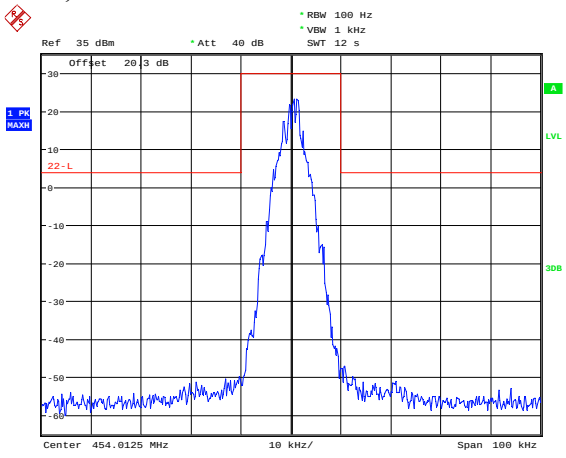


Date: 13.JAN.2022 16:28:41

Additional Channel Part 22, 454.0125 MHz



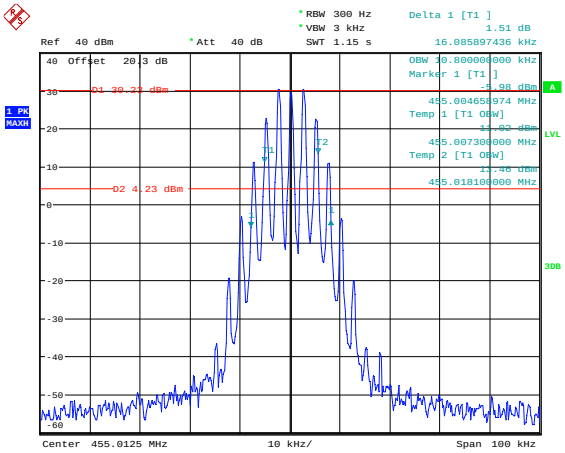
Date: 13.JAN.2022 15:45:10



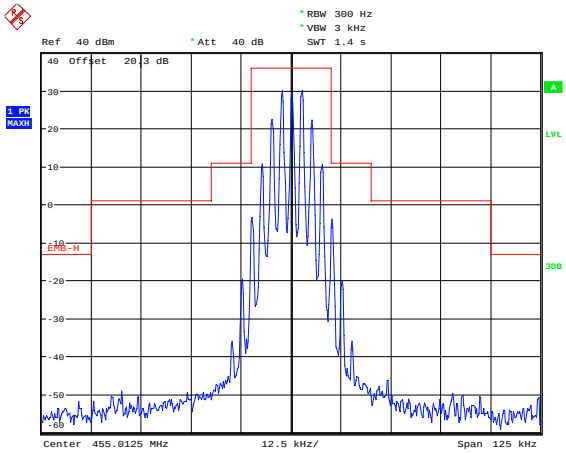
Date: 13.JAN.2022 16:34:15

FM, 25 kHz, High Power:

Additional Channel Part 74, 455.0125 MHz

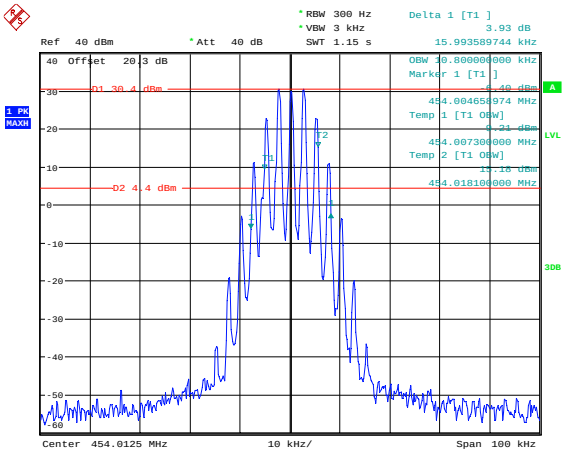


Date: 13.JAN.2022 15:03:57

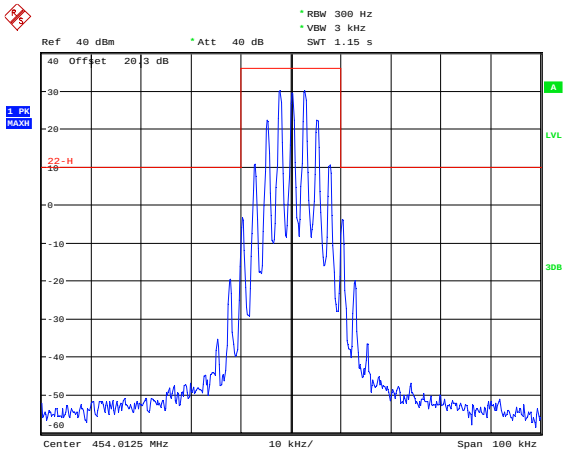


Date: 13.JAN.2022 16:10:14

Additional Channel Part 22, 454.0125 MHz



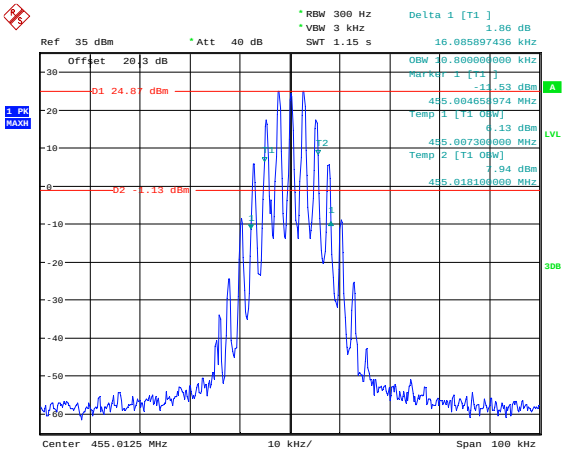
Date: 13.JAN.2022 15:09:06



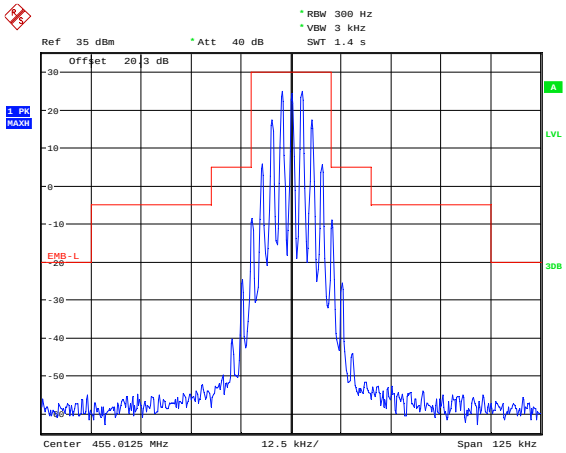
Date: 13.JAN.2022 16:16:26

FM, 25 kHz, Low Power:

Additional Channel Part 74, 455.0125 MHz

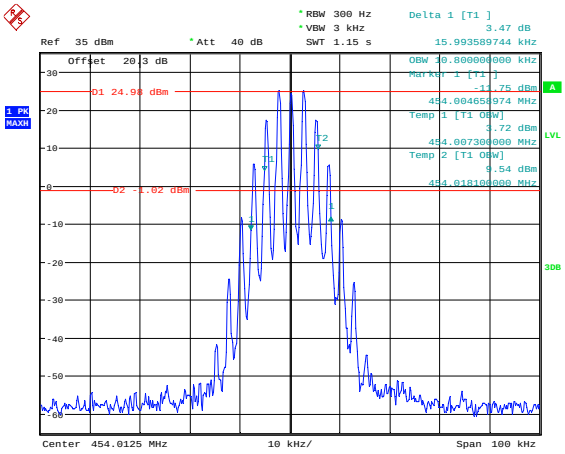


Date: 13.JAN.2022 15:07:31

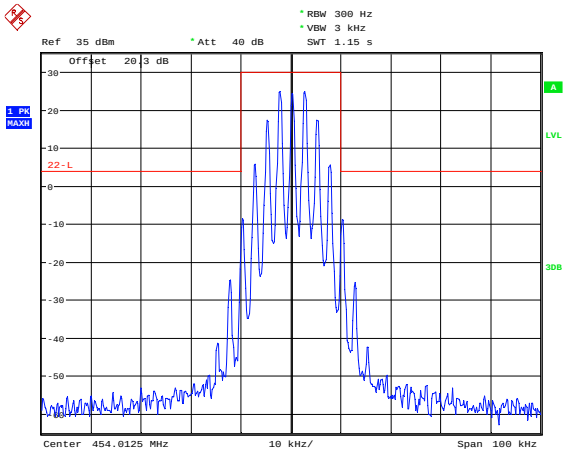


Date: 13.JAN.2022 16:11:19

Additional Channel Part 22, 454.0125 MHz



Date: 13.JAN.2022 15:10:28



Date: 13.JAN.2022 16:15:42

4.4 SPURIOUS EMISSIONS AT ANTENNA TERMINALS:

Serial Number:	CR21120025-RF-S2	Test Date:	2022-01-13~2022-02-15
Test Site:	RF	Test Mode:	Transmitting (High power was tested)
Tester:	Morpheus Shi	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.3~21.4	Relative Humidity: (%)	44~51	ATM Pressure: (kPa)	101.4~101.7

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2021-07-22	2022-07-21
YINSAIGE	Coaxial Cable	SS402	SJ0100004	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100003	Each time	N/A
Weinschel	Power splitter	1515	RA915	Each time	N/A
HP	RF Communications Test Set	8920A	3438A05209	2021-07-22	2022-07-21
E-Microwave	Band Rejector Filter	OBF-ZP-400-520-NF	OE0120256	2022-01-23	2023-01-22
E-Microwave	Band Rejector Filter	OBF-ZP-400-520-NF	OE0120256	2021-01-23	2022-01-22

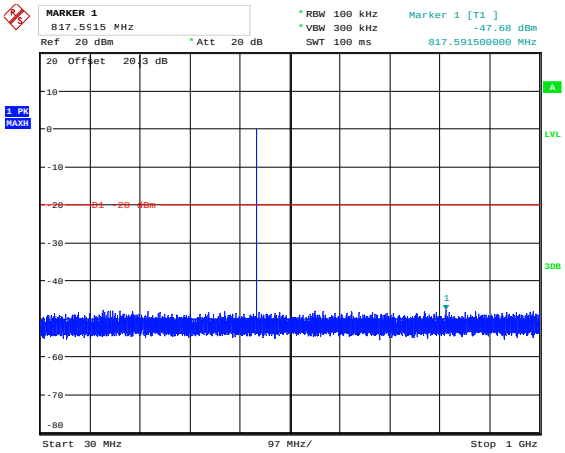
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

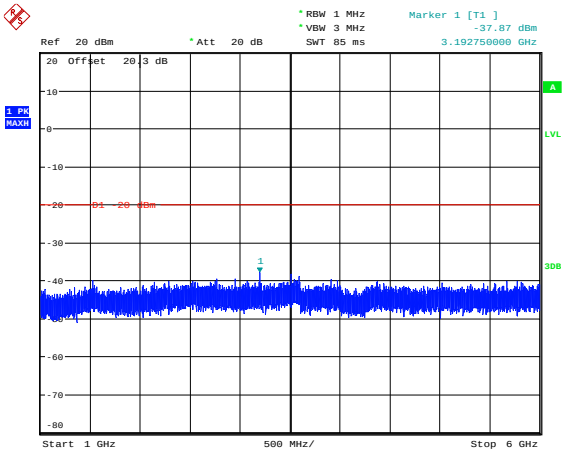
Note: Test performed at high power level with Band Rejector Filter, please refer to the following plots.

FM, 12.5kHz:

Low Channel, 450.0125 MHz

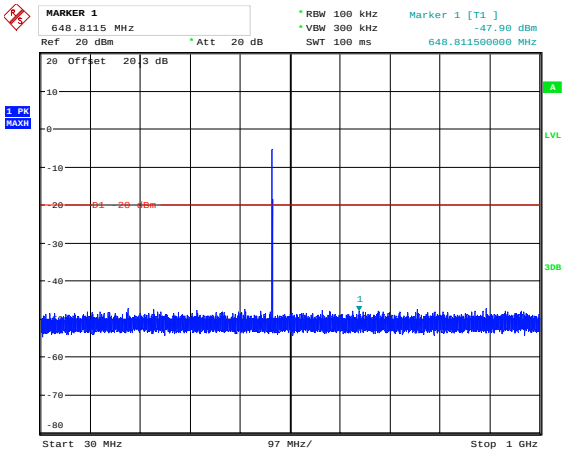


Date: 13.JAN.2022 18:12:14

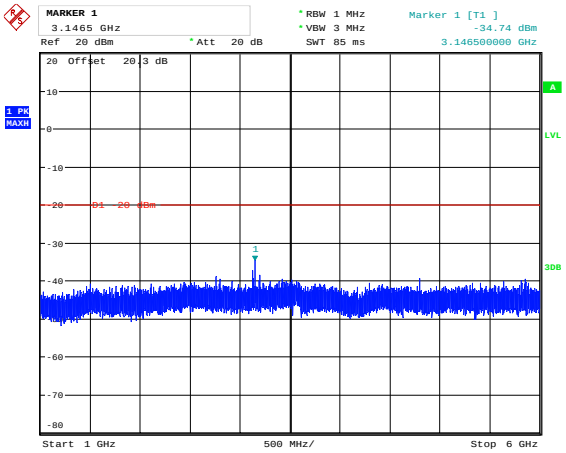


Date: 13.JAN.2022 19:27:37

Middle Channel,480.0125 MHz

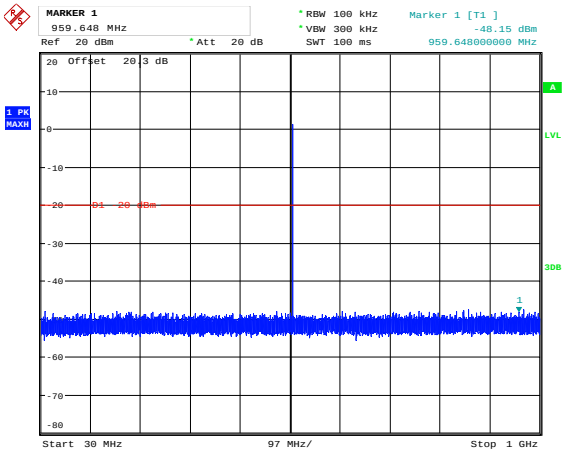


Date: 15.FEB.2022 15:38:53

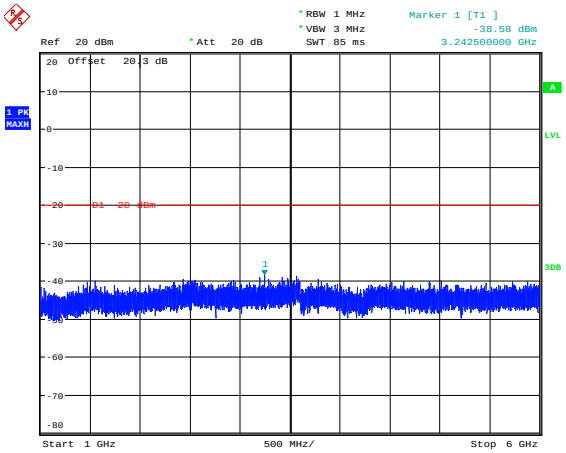


Date: 15.FEB.2022 15:42:20

High Channel,519.9875 MHz



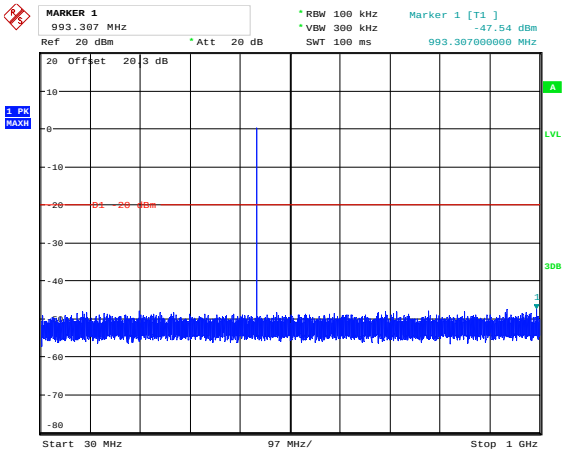
Date: 13.JAN.2022 18:14:28



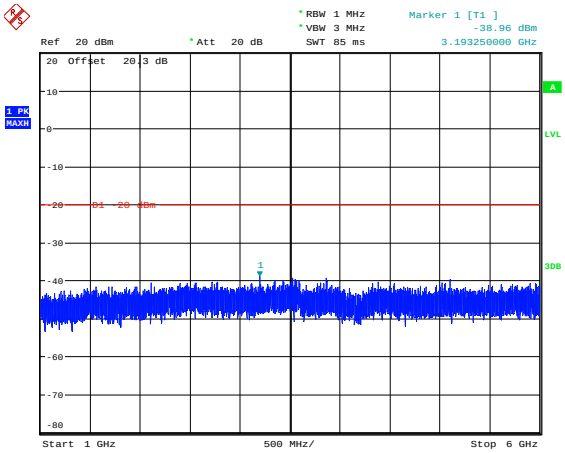
Date: 13.JAN.2022 19:25:49

4FSK, 12.5kHz:

Low Channel, 450.0125 MHz

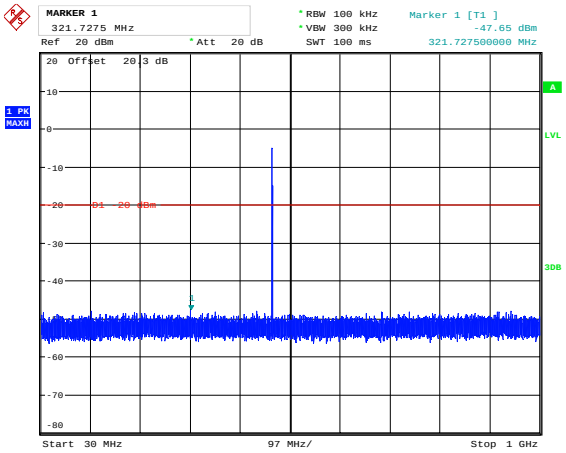


Date: 13.JAN.2022 18:18:42

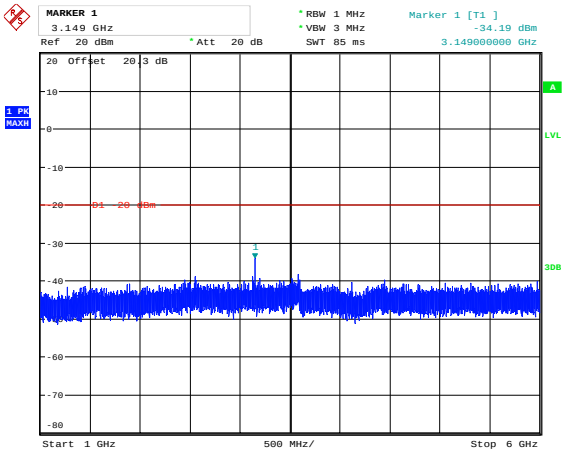


Date: 13.JAN.2022 19:24:05

Middle Channel, 480.0125 MHz

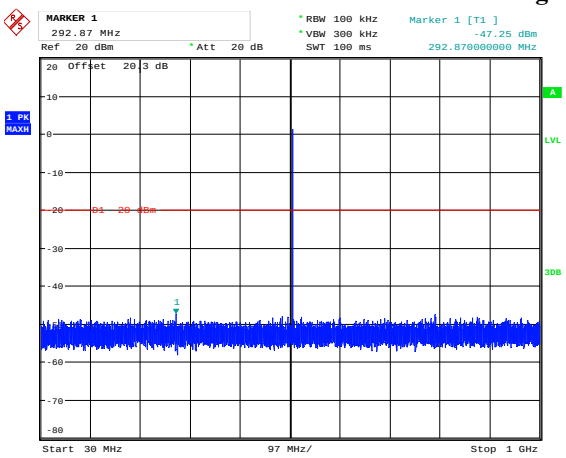


Date: 15.FEB.2022 15:39:42

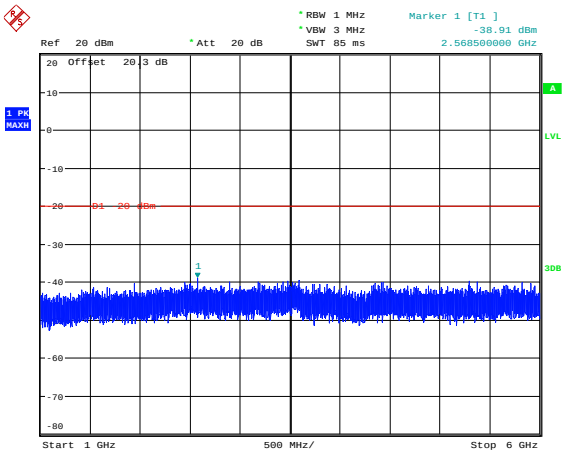


Date: 15.FEB.2022 15:41:02

High Channel, 519.9875 MHz



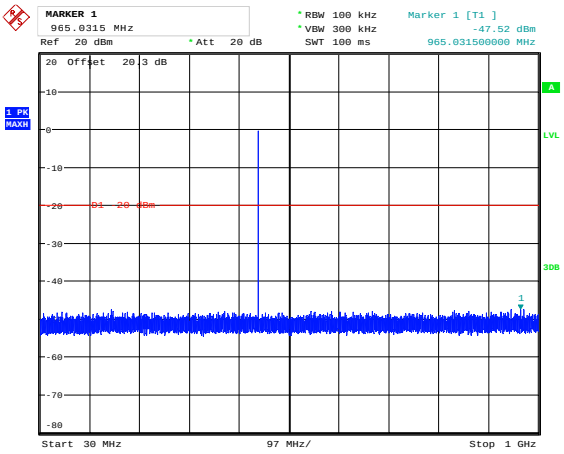
Date: 13.JAN.2022 18:20:23



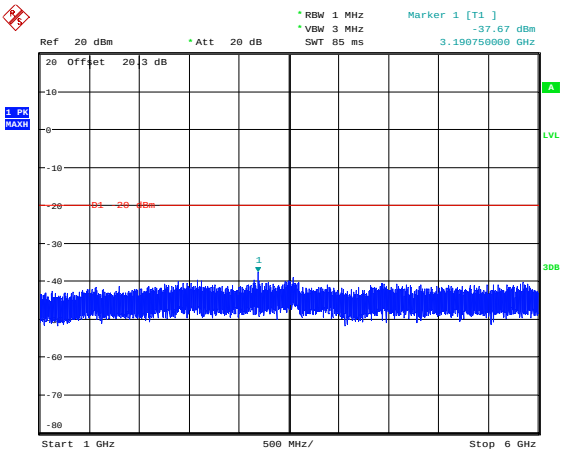
Date: 13.JAN.2022 19:23:26

Part 74:

FM,12.5kHz, 455.0125 MHz

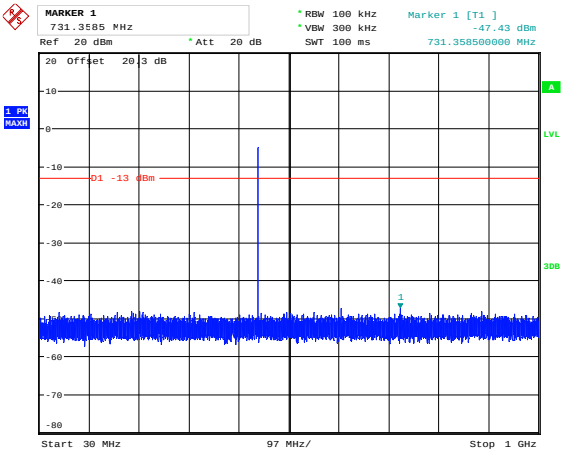


Date: 13.JAN.2022 18:15:37

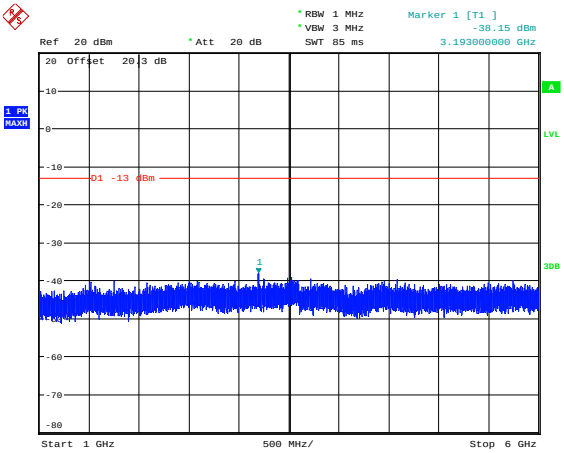


Date: 13.JAN.2022 19:25:06

FM,25kHz, 455.0125 MHz

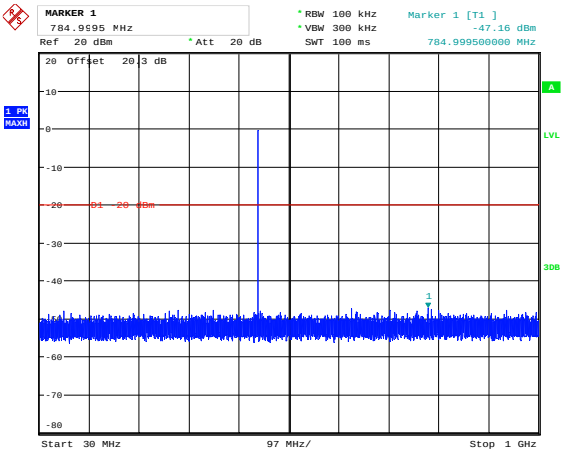


Date: 13.JAN.2022 19:11:11

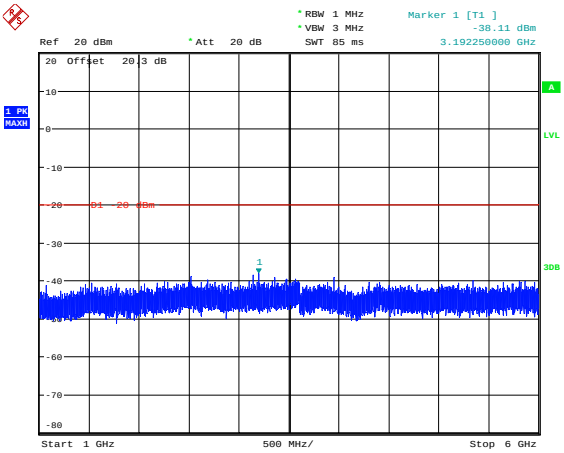


Date: 13.JAN.2022 19:17:02

4FSK,12.5kHz, 455.0125 MHz



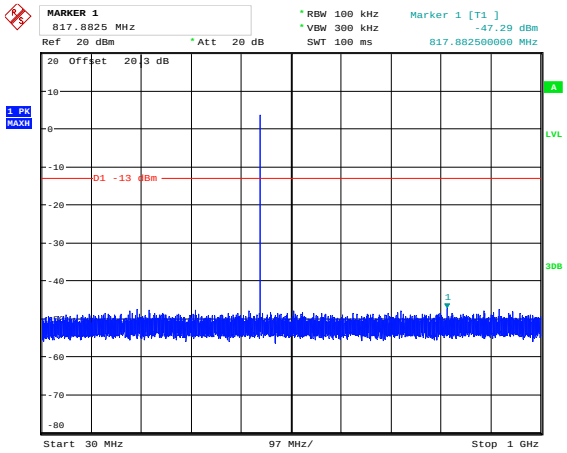
Date: 13.JAN.2022 18:21:18



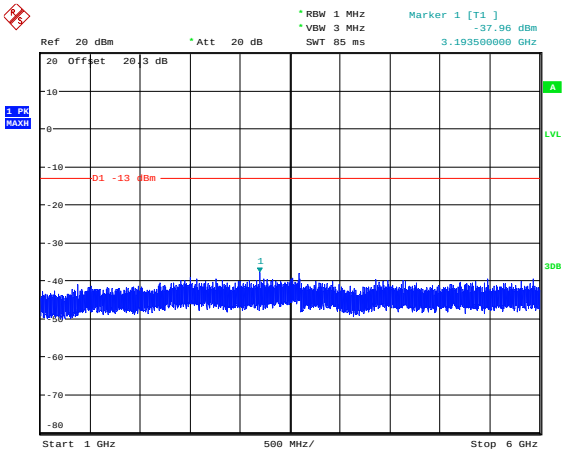
Date: 13.JAN.2022 19:23:08

Part 22:

FM,12.5kHz, 454.0125 MHz

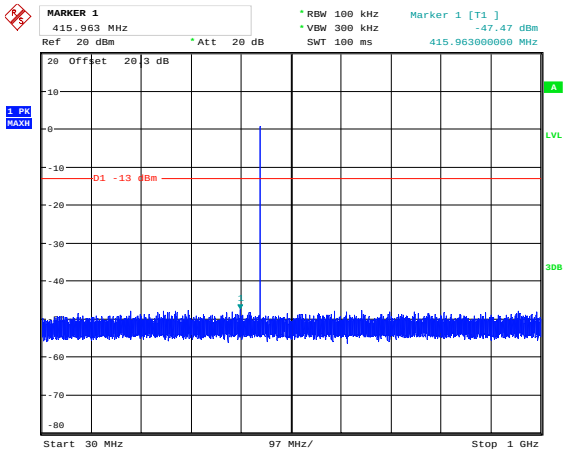


Date: 13.JAN.2022 19:13:58

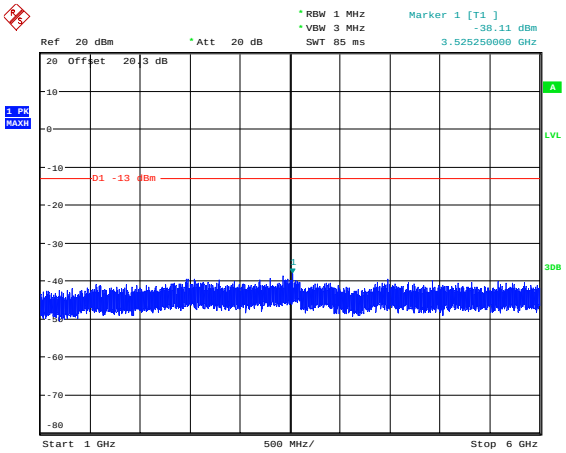


Date: 13.JAN.2022 19:17:58

FM,25kHz, 454.0125 MHz

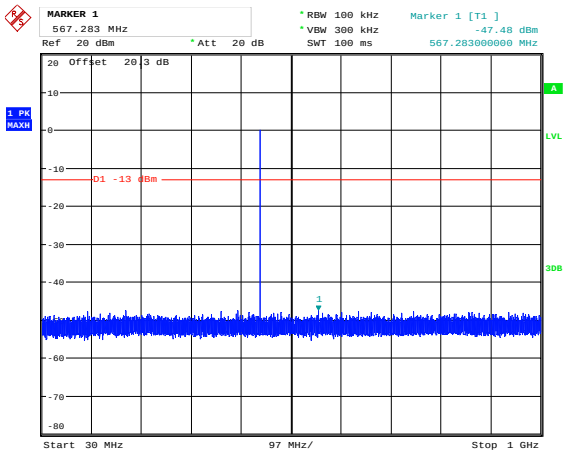


Date: 13.JAN.2022 19:12:06

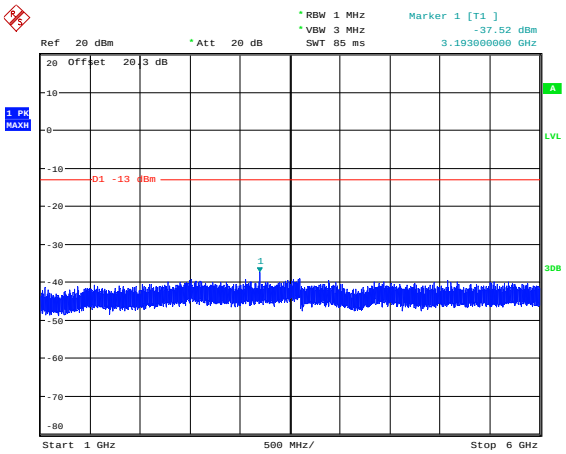


Date: 13.JAN.2022 19:19:00

4FSK,12.5kHz, 454.0125 MHz



Date: 13.JAN.2022 19:09:45



Date: 13.JAN.2022 19:08:15

4.5 RADIATED SPURIOUS EMISSIONS:

Serial Number:	CR21120025-RF-S2 CR21120025-RF-S3 CR21120025-RF-S4	Test Date:	2022-01-24~2022-01-25
Test Site:	966-1/966-2	Test Mode:	Transmitting (High power was tested)
Tester:	Tommy Luo, Great Qiao	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	19.3~19.7	Relative Humidity: (%)	52~67	ATM Pressure: (kPa)	101.3~101.5

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020-10-19	2023-10-18
R&S	EMI Test Receiver	ESR3	102724	2021-07-22	2022-07-21
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2021-07-18	2022-07-17
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2021-07-18	2022-07-17
Sonoma	Amplifier	310N	186165	2021-07-18	2022-07-17
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
MICRO-COAX	Coaxial Cable	UFA210B-0-0720-300300	99G1448	2021-07-25	2022-07-24
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020-10-13	2023-10-12
R&S	Spectrum Analyzer	FSV40	101591	2021-07-22	2022-07-21
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2021-08-08	2022-08-07
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2021-08-08	2022-08-07
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2021-11-10	2022-11-09
AH	Double Ridge Guide Horn Antenna	SAS-571	1396	2021-10-18	2024-10-17
MICRO-COAX	Coaxial Cable	UFA210B-0-0720-300300	99G1448	2021-07-25	2022-07-24
Agilent	Signal Generator	E8247C	MY43321352	2021-04-25	2022-04-24
E-Microwave	Band Rejector Filter	OBF-ZP-400-520-NF	OE0120256	2022-01-23	2023-01-22

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Note:

Test only performed with High power level. The device can be mounted in multiple orientations, test was performed with X,Y, Z Axis, the worst orientation was photographed and it`s data was recorded.

All models T03-00312-HCDA, T03-00312-HBAA, T03-00312-HAAA were pre-scanned, T03-00312-HCDA was found to be the worst case and its data is shown in the below.

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Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 450.0125MHz-12.5 kHz								
900.03	H	42.14	-57.16	0.00	0.63	-57.79	-20.00	37.79
900.03	V	59.17	-37.26	0.00	0.63	-37.89	-20.00	17.89
1350.04	H	39.06	-64.16	8.08	0.79	-56.87	-20.00	36.87
1350.04	V	42.19	-61.28	8.08	0.79	-53.99	-20.00	33.99
1800.05	H	44.02	-59.48	8.86	0.90	-51.52	-20.00	31.52
1800.05	V	43.24	-60.45	8.86	0.90	-52.49	-20.00	32.49
2250.06	H	50.42	-51.71	9.25	0.93	-43.39	-20.00	23.39
2250.06	V	51.60	-50.47	9.25	0.93	-42.15	-20.00	22.15
2700.08	H	52.59	-47.39	9.72	1.04	-38.71	-20.00	18.71
2700.08	V	52.41	-47.53	9.72	1.04	-38.85	-20.00	18.85
3150.09	H	37.79	-59.55	10.26	1.14	-50.43	-20.00	30.43
3150.09	V	35.90	-61.26	10.26	1.14	-52.14	-20.00	32.14
3600.10	H	36.71	-60.84	10.50	1.24	-51.58	-20.00	31.58
3600.10	V	34.61	-62.80	10.50	1.24	-53.54	-20.00	33.54
4050.11	H	44.97	-50.92	10.87	1.32	-41.37	-20.00	21.37
4050.11	V	44.46	-51.31	10.87	1.32	-41.76	-20.00	21.76
4500.13	H	48.84	-46.94	10.60	1.38	-37.72	-20.00	17.72
4500.13	V	48.29	-47.23	10.60	1.38	-38.01	-20.00	18.01
4FSK, Frequency: 450.0125MHz -12.5 kHz								
900.03	H	42.26	-57.04	0.00	0.63	-57.67	-20.00	37.67
900.03	V	59.93	-36.50	0.00	0.63	-37.13	-20.00	17.13
1350.04	H	38.12	-65.10	8.08	0.79	-57.81	-20.00	37.81
1350.04	V	43.21	-60.26	8.08	0.79	-52.97	-20.00	32.97
1800.05	H	44.24	-59.26	8.86	0.90	-51.30	-20.00	31.30
1800.05	V	43.12	-60.57	8.86	0.90	-52.61	-20.00	32.61
2250.06	H	50.26	-51.87	9.25	0.93	-43.55	-20.00	23.55
2250.06	V	51.39	-50.68	9.25	0.93	-42.36	-20.00	22.36
2700.08	H	52.37	-47.61	9.72	1.04	-38.93	-20.00	18.93
2700.08	V	52.92	-47.02	9.72	1.04	-38.34	-20.00	18.34
3150.09	H	37.88	-59.46	10.26	1.14	-50.34	-20.00	30.34
3150.09	V	35.84	-61.32	10.26	1.14	-52.20	-20.00	32.20
3600.10	H	38.62	-58.93	10.50	1.24	-49.67	-20.00	29.67
3600.10	V	37.43	-59.98	10.50	1.24	-50.72	-20.00	30.72
4050.11	H	45.65	-50.24	10.87	1.32	-40.69	-20.00	20.69
4050.11	V	45.16	-50.61	10.87	1.32	-41.06	-20.00	21.06
4500.13	H	49.11	-46.67	10.60	1.38	-37.45	-20.00	17.45
4500.13	V	48.00	-47.52	10.60	1.38	-38.30	-20.00	18.30

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 480.0125MHz-12.5 kHz								
960.03	H	49.94	-47.55	0.00	0.62	-48.17	-20.00	28.17
960.03	V	63.46	-31.66	0.00	0.62	-32.28	-20.00	12.28
1440.04	H	39.73	-63.87	8.33	0.74	-56.28	-20.00	36.28
1440.04	V	44.98	-58.69	8.33	0.74	-51.10	-20.00	31.10
1920.05	H	44.88	-57.92	9.00	0.86	-49.78	-20.00	29.78
1920.05	V	44.59	-57.81	9.00	0.86	-49.67	-20.00	29.67
2400.06	H	50.71	-50.34	9.34	0.98	-41.98	-20.00	21.98
2400.06	V	50.52	-50.27	9.34	0.98	-41.91	-20.00	21.91
2880.08	H	52.82	-46.75	10.01	1.07	-37.81	-20.00	17.81
2880.08	V	52.05	-47.57	10.01	1.07	-38.63	-20.00	18.63
3360.09	H	38.18	-59.13	10.34	1.17	-49.96	-20.00	29.96
3360.09	V	36.52	-60.69	10.34	1.17	-51.52	-20.00	31.52
3840.10	H	36.44	-59.50	10.74	1.28	-50.04	-20.00	30.04
3840.10	V	34.93	-60.90	10.74	1.28	-51.44	-20.00	31.44
4320.11	H	46.21	-49.94	10.71	1.35	-40.58	-20.00	20.58
4320.11	V	44.65	-51.40	10.71	1.35	-42.04	-20.00	22.04
4800.13	H	48.65	-45.46	10.96	1.44	-35.94	-20.00	15.94
4800.13	V	49.83	-44.08	10.96	1.44	-34.56	-20.00	14.56
4FSK, Frequency: 480.0125MHz-12.5 kHz								
960.03	H	52.11	-45.38	0.00	0.62	-46.00	-20.00	26.00
960.03	V	61.44	-33.68	0.00	0.62	-34.30	-20.00	14.30
1440.04	H	40.21	-63.39	8.33	0.74	-55.80	-20.00	35.80
1440.04	V	44.55	-59.12	8.33	0.74	-51.53	-20.00	31.53
1920.05	H	44.47	-58.33	9.00	0.86	-50.19	-20.00	30.19
1920.05	V	44.09	-58.31	9.00	0.86	-50.17	-20.00	30.17
2400.06	H	51.02	-50.03	9.34	0.98	-41.67	-20.00	21.67
2400.06	V	51.50	-49.29	9.34	0.98	-40.93	-20.00	20.93
2880.08	H	53.09	-46.48	10.01	1.07	-37.54	-20.00	17.54
2880.08	V	52.39	-47.23	10.01	1.07	-38.29	-20.00	18.29
3360.09	H	38.28	-59.03	10.34	1.17	-49.86	-20.00	29.86
3360.09	V	37.38	-59.83	10.34	1.17	-50.66	-20.00	30.66
3840.10	H	38.34	-57.60	10.74	1.28	-48.14	-20.00	28.14
3840.10	V	37.98	-57.85	10.74	1.28	-48.39	-20.00	28.39
4320.11	H	47.03	-49.12	10.71	1.35	-39.76	-20.00	19.76
4320.11	V	45.74	-50.31	10.71	1.35	-40.95	-20.00	20.95
4800.13	H	48.46	-45.65	10.96	1.44	-36.13	-20.00	16.13
4800.13	V	49.19	-44.72	10.96	1.44	-35.20	-20.00	15.20

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency:519.9875MHz-12.5 kHz								
159.37	H	30.98	-80.64	0.00	0.23	-80.87	-20.00	60.87
66.34	V	38.48	-65.37	-6.94	0.15	-72.46	-20.00	52.46
1039.98	H	51.25	-51.65	7.21	0.65	-45.09	-20.00	25.09
1039.98	V	55.85	-47.36	7.21	0.65	-40.80	-20.00	20.80
1559.96	H	37.58	-66.42	8.57	0.80	-58.65	-20.00	38.65
1559.96	V	41.40	-62.66	8.57	0.80	-54.89	-20.00	34.89
2079.95	H	50.75	-51.18	9.15	0.91	-42.94	-20.00	22.94
2079.95	V	48.41	-53.35	9.15	0.91	-45.11	-20.00	25.11
2599.94	H	47.31	-52.62	9.56	1.02	-44.08	-20.00	24.08
2599.94	V	46.95	-52.84	9.56	1.02	-44.30	-20.00	24.30
3119.93	H	45.60	-51.88	10.25	1.13	-42.76	-20.00	22.76
3119.93	V	42.94	-54.39	10.25	1.13	-45.27	-20.00	25.27
3639.91	H	44.47	-52.99	10.54	1.22	-43.67	-20.00	23.67
3639.91	V	44.74	-52.63	10.54	1.22	-43.31	-20.00	23.31
4159.90	H	59.52	-36.45	10.80	1.29	-26.94	-20.00	6.94
4159.90	V	51.99	-43.95	10.80	1.29	-34.44	-20.00	14.44
4679.89	H	54.70	-40.25	10.82	1.41	-30.84	-20.00	10.84
4679.89	V	55.70	-39.24	10.82	1.41	-29.83	-20.00	9.83
5199.88	H	53.70	-40.45	11.32	1.44	-30.57	-20.00	10.57
5199.88	V	49.46	-44.54	11.32	1.44	-34.66	-20.00	14.66

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
4FSK, Frequency: 519.9875MHz-12.5 kHz								
185.53	H	34.86	-77.74	0.00	0.26	-78.00	-20.00	58.00
66.34	V	38.86	-64.99	-6.94	0.15	-72.08	-20.00	52.08
1039.98	H	50.77	-52.13	7.21	0.65	-45.57	-20.00	25.57
1039.98	V	55.89	-47.32	7.21	0.65	-40.76	-20.00	20.76
1559.96	H	37.03	-66.97	8.57	0.80	-59.20	-20.00	39.20
1559.96	V	42.31	-61.75	8.57	0.80	-53.98	-20.00	33.98
2079.95	H	48.80	-53.13	9.15	0.91	-44.89	-20.00	24.89
2079.95	V	49.94	-51.82	9.15	0.91	-43.58	-20.00	23.58
2599.94	H	49.00	-50.93	9.56	1.02	-42.39	-20.00	22.39
2599.94	V	48.12	-51.67	9.56	1.02	-43.13	-20.00	23.13
3119.93	H	45.39	-52.09	10.25	1.13	-42.97	-20.00	22.97
3119.93	V	42.60	-54.73	10.25	1.13	-45.61	-20.00	25.61
3639.91	H	45.78	-51.68	10.54	1.22	-42.36	-20.00	22.36
3639.91	V	45.70	-51.67	10.54	1.22	-42.35	-20.00	22.35
4159.90	H	59.43	-36.54	10.80	1.29	-27.03	-20.00	7.03
4159.90	V	54.32	-41.62	10.80	1.29	-32.11	-20.00	12.11
4679.89	H	56.74	-38.21	10.82	1.41	-28.80	-20.00	8.80
4679.89	V	58.27	-36.67	10.82	1.41	-27.26	-20.00	7.26
5199.88	H	57.98	-36.17	11.32	1.44	-26.29	-20.00	6.29
5199.88	V	52.73	-41.27	11.32	1.44	-31.39	-20.00	11.39

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Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 455.0125MHz-12.5 kHz								
910.03	H	51.75	-47.25	0.00	0.54	-47.79	-20.00	27.79
910.03	V	61.60	-34.61	0.00	0.54	-35.15	-20.00	15.15
1365.04	H	39.49	-63.88	8.12	0.77	-56.53	-20.00	36.53
1365.04	V	43.23	-60.32	8.12	0.77	-52.97	-20.00	32.97
1820.05	H	44.21	-59.18	8.88	0.90	-51.20	-20.00	31.20
1820.05	V	46.43	-57.05	8.88	0.90	-49.07	-20.00	29.07
2275.06	H	50.16	-51.87	9.27	0.96	-43.56	-20.00	23.56
2275.06	V	51.85	-50.04	9.27	0.96	-41.73	-20.00	21.73
2730.08	H	46.24	-53.72	9.77	1.06	-45.01	-20.00	25.01
2730.08	V	48.63	-51.27	9.77	1.06	-42.56	-20.00	22.56
3185.09	H	37.86	-59.33	10.27	1.12	-50.18	-20.00	30.18
3185.09	V	37.49	-59.47	10.27	1.12	-50.32	-20.00	30.32
3640.10	H	34.81	-62.65	10.54	1.22	-53.33	-20.00	33.33
3640.10	V	35.57	-61.80	10.54	1.22	-52.48	-20.00	32.48
4095.11	H	44.48	-51.52	10.84	1.27	-41.95	-20.00	21.95
4095.11	V	43.87	-52.09	10.84	1.27	-42.52	-20.00	22.52
4550.13	H	50.36	-45.25	10.66	1.36	-35.95	-20.00	15.95
4550.13	V	52.34	-43.06	10.66	1.36	-33.76	-20.00	13.76
FM, Frequency: 455.0125MHz-25 kHz								
910.03	H	50.91	-48.09	0.00	0.54	-48.63	-13.00	35.63
910.03	V	62.76	-33.45	0.00	0.54	-33.99	-13.00	20.99
1365.04	H	38.91	-64.46	8.12	0.77	-57.11	-13.00	44.11
1365.04	V	42.92	-60.63	8.12	0.77	-53.28	-13.00	40.28
1820.05	H	43.66	-59.73	8.88	0.90	-51.75	-13.00	38.75
1820.05	V	46.30	-57.18	8.88	0.90	-49.20	-13.00	36.20
2275.06	H	49.65	-52.38	9.27	0.96	-44.07	-13.00	31.07
2275.06	V	51.90	-49.99	9.27	0.96	-41.68	-13.00	28.68
2730.08	H	45.58	-54.38	9.77	1.06	-45.67	-13.00	32.67
2730.08	V	48.31	-51.59	9.77	1.06	-42.88	-13.00	29.88
3185.09	H	38.19	-59.00	10.27	1.12	-49.85	-13.00	36.85
3185.09	V	36.22	-60.74	10.27	1.12	-51.59	-13.00	38.59
3640.10	H	35.38	-62.08	10.54	1.22	-52.76	-13.00	39.76
3640.10	V	35.08	-62.29	10.54	1.22	-52.97	-13.00	39.97
4095.11	H	43.71	-52.29	10.84	1.27	-42.72	-13.00	29.72
4095.11	V	44.15	-51.81	10.84	1.27	-42.24	-13.00	29.24
4550.13	H	50.58	-45.03	10.66	1.36	-35.73	-13.00	22.73
4550.13	V	51.82	-43.58	10.66	1.36	-34.28	-13.00	21.28

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
4FSK, Frequency: 455.0125MHz-12.5 kHz								
910.03	H	50.13	-48.87	0.00	0.54	-49.41	-20.00	29.41
910.03	V	61.42	-34.79	0.00	0.54	-35.33	-20.00	15.33
1365.04	H	38.03	-65.34	8.12	0.77	-57.99	-20.00	37.99
1365.04	V	43.00	-60.55	8.12	0.77	-53.20	-20.00	33.20
1820.05	H	43.26	-60.13	8.88	0.90	-52.15	-20.00	32.15
1820.05	V	46.12	-57.36	8.88	0.90	-49.38	-20.00	29.38
2275.06	H	47.59	-54.44	9.27	0.96	-46.13	-20.00	26.13
2275.06	V	50.02	-51.87	9.27	0.96	-43.56	-20.00	23.56
2730.08	H	46.05	-53.91	9.77	1.06	-45.20	-20.00	25.20
2730.08	V	48.43	-51.47	9.77	1.06	-42.76	-20.00	22.76
3185.09	H	38.42	-58.77	10.27	1.12	-49.62	-20.00	29.62
3185.09	V	35.90	-61.06	10.27	1.12	-51.91	-20.00	31.91
3640.10	H	37.20	-60.26	10.54	1.22	-50.94	-20.00	30.94
3640.10	V	37.96	-59.41	10.54	1.22	-50.09	-20.00	30.09
4095.11	H	46.60	-49.40	10.84	1.27	-39.83	-20.00	19.83
4095.11	V	44.72	-51.24	10.84	1.27	-41.67	-20.00	21.67
4550.13	H	50.18	-45.43	10.66	1.36	-36.13	-20.00	16.13
4550.13	V	51.98	-43.42	10.66	1.36	-34.12	-20.00	14.12

Part 22

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 454.0125MHz-12.5 kHz								
908.03	H	55.64	-43.42	0.00	0.54	-43.96	-13.00	30.96
908.03	V	61.03	-35.23	0.00	0.54	-35.77	-13.00	22.77
1362.04	H	39.16	-64.18	8.11	0.77	-56.84	-13.00	43.84
1362.04	V	44.14	-59.40	8.11	0.77	-52.06	-13.00	39.06
1816.05	H	43.49	-59.92	8.88	0.90	-51.94	-13.00	38.94
1816.05	V	47.76	-55.76	8.88	0.90	-47.78	-13.00	34.78
2270.06	H	47.54	-54.51	9.26	0.95	-46.20	-13.00	33.20
2270.06	V	51.91	-50.02	9.26	0.95	-41.71	-13.00	28.71
2724.08	H	44.95	-55.02	9.76	1.05	-46.31	-13.00	33.31
2724.08	V	49.28	-50.63	9.76	1.05	-41.92	-13.00	28.92
3178.09	H	38.02	-59.20	10.27	1.12	-50.05	-13.00	37.05
3178.09	V	38.22	-58.78	10.27	1.12	-49.63	-13.00	36.63
3632.10	H	36.55	-60.93	10.53	1.22	-51.62	-13.00	38.62
3632.10	V	37.48	-59.90	10.53	1.22	-50.59	-13.00	37.59
4086.11	H	43.59	-52.39	10.85	1.28	-42.82	-13.00	29.82
4086.11	V	44.96	-50.96	10.85	1.28	-41.39	-13.00	28.39
4540.13	H	47.74	-47.91	10.65	1.36	-38.62	-13.00	25.62
4540.13	V	51.06	-44.36	10.65	1.36	-35.07	-13.00	22.07
FM, Frequency: 454.0125MHz-25 kHz								
908.03	H	56.15	-42.91	0.00	0.54	-43.45	-13.00	30.45
908.03	V	60.23	-36.03	0.00	0.54	-36.57	-13.00	23.57
1362.04	H	36.66	-66.68	8.11	0.77	-59.34	-13.00	46.34
1362.04	V	38.74	-64.80	8.11	0.77	-57.46	-13.00	44.46
1816.05	H	42.94	-60.47	8.88	0.90	-52.49	-13.00	39.49
1816.05	V	43.03	-60.49	8.88	0.90	-52.51	-13.00	39.51
2270.06	H	42.48	-59.57	9.26	0.95	-51.26	-13.00	38.26
2270.06	V	43.83	-58.10	9.26	0.95	-49.79	-13.00	36.79
2724.08	H	40.84	-59.13	9.76	1.05	-50.42	-13.00	37.42
2724.08	V	40.02	-59.89	9.76	1.05	-51.18	-13.00	38.18
3178.09	H	36.03	-61.19	10.27	1.12	-52.04	-13.00	39.04
3178.09	V	34.15	-62.85	10.27	1.12	-53.70	-13.00	40.70
3632.10	H	34.67	-62.81	10.53	1.22	-53.50	-13.00	40.50
3632.10	V	35.58	-61.80	10.53	1.22	-52.49	-13.00	39.49
4086.11	H	40.39	-55.59	10.85	1.28	-46.02	-13.00	33.02
4086.11	V	42.92	-53.00	10.85	1.28	-43.43	-13.00	30.43
4540.13	H	47.85	-47.80	10.65	1.36	-38.51	-13.00	25.51
4540.13	V	41.94	-53.48	10.65	1.36	-44.19	-13.00	31.19

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
4FSK,Frequency: 454.0125MHz-12.5 kHz								
908.03	H	54.42	-44.64	0.00	0.54	-45.18	-13.00	32.18
908.03	V	63.33	-32.93	0.00	0.54	-33.47	-13.00	20.47
1362.04	H	39.49	-63.85	8.11	0.77	-56.51	-13.00	43.51
1362.04	V	44.42	-59.12	8.11	0.77	-51.78	-13.00	38.78
1816.05	H	44.19	-59.22	8.88	0.90	-51.24	-13.00	38.24
1816.05	V	47.21	-56.31	8.88	0.90	-48.33	-13.00	35.33
2270.06	H	45.19	-56.86	9.26	0.95	-48.55	-13.00	35.55
2270.06	V	47.42	-54.51	9.26	0.95	-46.20	-13.00	33.20
2724.08	H	45.89	-54.08	9.76	1.05	-45.37	-13.00	32.37
2724.08	V	49.23	-50.68	9.76	1.05	-41.97	-13.00	28.97
3178.09	H	38.58	-58.64	10.27	1.12	-49.49	-13.00	36.49
3178.09	V	37.15	-59.85	10.27	1.12	-50.70	-13.00	37.70
3632.10	H	37.38	-60.10	10.53	1.22	-50.79	-13.00	37.79
3632.10	V	38.14	-59.24	10.53	1.22	-49.93	-13.00	36.93
4086.11	H	43.92	-52.06	10.85	1.28	-42.49	-13.00	29.49
4086.11	V	45.68	-50.24	10.85	1.28	-40.67	-13.00	27.67
4540.13	H	48.68	-46.97	10.65	1.36	-37.68	-13.00	24.68
4540.13	V	50.30	-45.12	10.65	1.36	-35.83	-13.00	22.83

Note 1:The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

4.6 FREQUENCY STABILITY:

Serial Number:	CR21120025-RF-S2	Test Date:	2022-01-13
Test Site:	RF	Test Mode:	Transmitting
Tester:	Morpheus Shi	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.3	Relative Humidity: (%)	44	ATM Pressure: (kPa)	101.7

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2021-07-22	2022-07-21
YINSAIGE	Coaxial Cable	SS402	SJ0100004	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100003	Each time	N/A
Weinschel	Power splitter	1515	RA915	Each time	N/A
HP	RF Communications Test Set	8920A	3438A05209	2021-07-22	2022-07-21
UNI-T	Multimeter	UT39A+	C210582554	2021-09-30	2022-09-29
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021-07-22	2022-07-21
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

FCC Part 90:

FM,12.5kHz, Reference Frequency: 480.0125 MHz, Limit: ±2.5 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	480.012713	0.44
-20		480.012499	0.00
-10		480.012706	0.43
0		480.012736	0.49
10		480.012490	-0.02
20		480.012700	0.42
30		480.012486	-0.03
40		480.012552	0.11
50		480.012486	-0.03
20	6.2	480.012627	0.26
20	8.4	480.012506	0.01

4FSK, 12.5kHz, Reference Frequency: 480.0125MHz, Limit: ±2.5 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	480.012517	0.04
-20		480.012491	-0.02
-10		480.012743	0.51
0		480.012737	0.49
10		480.012492	-0.02
20		480.012824	0.67
30		480.012672	0.36
40		480.012623	0.26
50		480.012477	-0.05
20	6.2	480.012507	0.01
20	8.4	480.012627	0.26

FCC Part 74:

FM, 12.5kHz, Reference Frequency: 455.0125 MHz, Limit: ±5.0 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	455.012543	0.095
-20		455.012512	0.026
-10		455.012532	0.070
0		455.012538	0.084
10		455.012535	0.077
20		455.01254	0.088
30		455.01251	0.022
40		455.01258	0.176
50		455.012529	0.064
20	6.2	455.012521	0.046
20	8.4	455.012524	0.053

4FSK, 12.5kHz, Reference Frequency: 455.0125 MHz, Limit: ±5.0 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	455.012612	0.246
-20		455.012622	0.268
-10		455.012621	0.266
0		455.012616	0.255
10		455.012611	0.244
20		455.01259	0.198
30		455.01263	0.286
40		455.01267	0.374
50		455.012608	0.237
20	6.2	455.012603	0.226
20	8.4	455.012604	0.229

FM, 25kHz, Reference Frequency: 455.0125 MHz, Limit: ±5.0 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	455.012512	0.026
-20		455.012523	0.051
-10		455.012513	0.029
0		455.012542	0.092
10		455.012512	0.026
20		455.01252	0.044
30		455.01253	0.066
40		455.01251	0.022
50		455.012524	0.053
20	6.2	455.012521	0.046
20	8.4	455.012522	0.048

FCC Part 22:

FM, 12.5kHz, Reference Frequency: 454.0125MHz, Limit: ±5.0 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	454.012539	0.09
-20		454.012682	0.40
-10		454.012645	0.32
0		454.012702	0.44
10		454.012549	0.11
20		454.012740	0.53
30		454.012624	0.27
40		454.012541	0.09
50		454.012548	0.11
20	6.2	454.012471	-0.06
20	8.4	454.012615	0.25

4FSK,12.5kHz, Reference Frequency: 454.0125MHz, Limit: ±5.0 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	454.012511	0.02
-20		454.012599	0.22
-10		454.012700	0.44
0		454.012648	0.33
10		454.012642	0.31
20		454.012740	0.53
30		454.012526	0.06
40		454.012464	-0.08
50		454.012714	0.47
20	6.2	454.012452	-0.11
20	8.4	454.012464	-0.08

FM, 25kHz, Reference Frequency: 454.0125MHz, Limit: ±5.0 ppm			
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**
-30	7.4	454.012747	0.54
-20		454.012662	0.36
-10		454.012466	-0.07
0		454.012711	0.46
10		454.012656	0.34
20		454.012727	0.50
30		454.012651	0.33
40		454.012521	0.05
50		454.012527	0.06
20	6.2	454.012599	0.22
20	8.4	454.012593	0.20

4.7 TRANSIENT FREQUENCY BEHAVIOR

Serial Number:	CR21120025-RF-S2	Test Date:	2022-02-16
Test Site:	RF	Test Mode:	Transmitting
Tester:	Morpheus Shi	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.8	Relative Humidity: (%)	55	ATM Pressure: (kPa)	101.1

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Signal Analyzer	FSIQ26	831929/006	2021-07-22	2022-07-21
YINSAIGE	Coaxial Cable	SS402	SJ0100004	Each time	N/A
YINSAIGE	Coaxial Cable	SS402	SJ0100003	Each time	N/A
Weinschel	Power splitter	1515	RA915	Each time	N/A
Weinschel	Coaxial Attenuators	53-20-34	LN751	Each time	N/A
HP	RF Communications Test Set	8920A	3438A05209	2021-07-22	2022-07-21

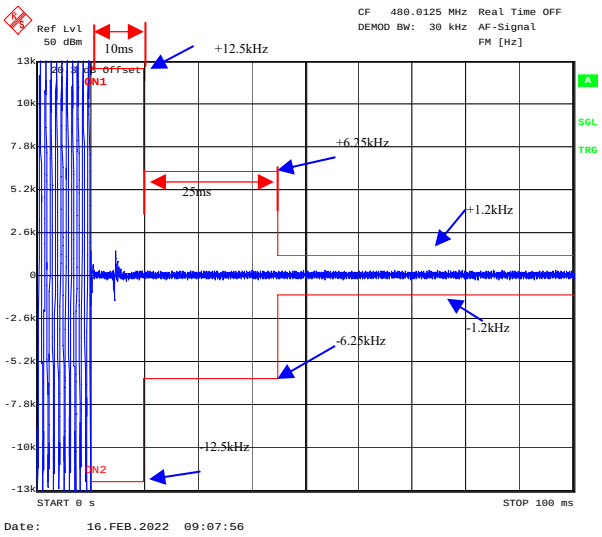
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

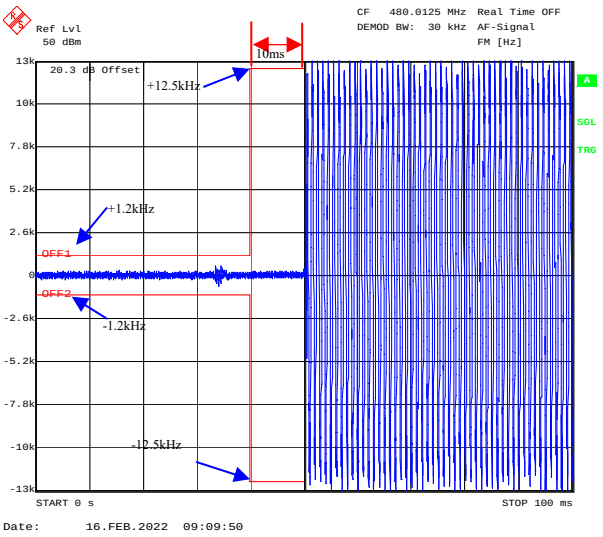
Channel Spacing (kHz)	Transient Period (ms)	Transient Frequency	Result
12.5	10(t_1)	±12.5 kHz	Pass
	25(t_2)	±6.25 kHz	
	10(t_3)	±12.5 kHz	

Note: During the time from the end of t2 to the beginning of t3, the frequency difference must not exceed the limits:
For 480.0125 MHz 12.5kHz mode, limit is: 480.0125 MHz* 2.5ppm = 1.200kHz

Tune ON



Tune OFF



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