



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 90 MEASUREMENT AND TEST REPORT

For

CALTTA TECHNOLOGIES CO., LTD.

Floor 12,Building G2, international E-City Nanshan District, Shenzhen, China

FCC ID: 2AQV762AS7100

Report Type: Original Report	Product Type: Remote Radio Unit
Report Number: RDG200813005-00A	
Report Date: 2020-08-26	
Reviewed By:	Ivan Cao Assistant Manager 
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Remote Radio Unit
EUT Model:	ZXSDR R8862A S7100
Operation Frequency:	LTE Band 14: 758-768 MHz(TX), 788-798 MHz(RX)
Modulation Type:	QPSK, 16QAM, 64QAM
Rated Input Voltage:	DC -37~-57V
Serial Number:	RDG200813004-RF-S1
EUT Received Date:	2020.8.15
EUT Received Status:	Good

Objective

This report is prepared on behalf of **CALTTA TECHNOLOGIES CO., LTD.** in accordance with: Part 2-Subpart J, Part 90 of the Federal Communications Commission's rules.

Related Submittal(s)/Grant(s)

No related submittal.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with:

the Code of federal Regulations Title 47, Part 2, Part 90

ANSI C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz ~ 1GHz: 5.85 dB 1G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%

Note: 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.

Test Facility

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

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. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

Declarations

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 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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SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to ANSI C63.26-2015.

The test items were performed with the EUT operating at testing mode. EUT have 4 Ports, antenna 1 and 4 are TX chain, antenna 2 and 3 are RX chain.

The device operates on LTE Band 14, test was performed with channels as below table:

Bands	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
LTE Band 14	1.4	758.7	763	767.3
	3	759.5	763	766.5
	5	760.5	763	765.5
	10	/	763	/

Equipment Modifications

No modification was made to the EUT.

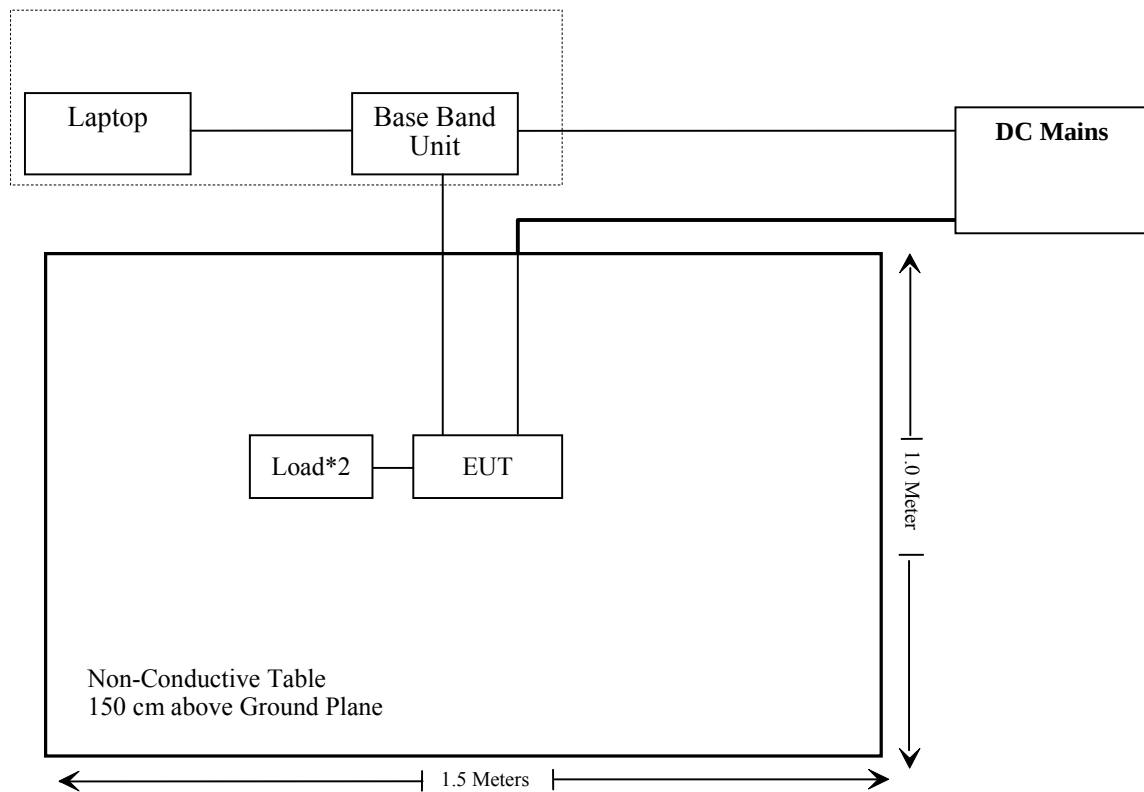
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Dell	Laptop	E6410	QEDF79492463233
BEW	Coaxial Termination	TF300-6-B	TF300-6-B-1
BEW	Coaxial Termination	TF300-6-B	TF300-6-B-2
Pro instrument	DC Power Supply	pps3300	3300012
CALTTA	LTE Baseband Unit	ZXSDR B8200	/

External I/O Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Optical fiber line	No	No	2	Remote Radio Unit	Baseband Unit
DC LINE	Yes	Yes	2	DC Main	EUT
Coaxial Cable*2	Yes	Yes	6	EUT	Coaxial Termination
RJ45*1	No	No	3	EUT	Laptop

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC§1.1310, §2.1091	Maximum Permissible Exposure (MPE)	Compliance
FCC§2.1046,§ 90.542	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Not Applicable
FCC§ 2.1049	Occupied Bandwidth	Compliance
FCC§ 2.1051,§ 90.543	Spurious Emissions at Antenna Terminal	Compliance
FCC§ 2.1051,§ 90.543	Field Strength of Spurious Radiation	Compliance
FCC§ 2.1051,§ 90.543	Out of band emission, Band Edge	Compliance
FCC§ 2.1055 §90.539	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

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

Applicable Standard

According to 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

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

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

According to §1.1310 and §2.1091 RF exposure is calculated.

MPE Calculation

Prediction of power density at the distance of the applicable MPE limit

$$S = PG/4\pi R^2$$

Where: S = 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

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

MPE Results

Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
758-768	10	10.00	52	158489	500.00	0.5047	0.505

Result: The device meet FCC MPE of the General Population/Uncontrolled use at 500 cm distance.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, §90.542- RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §90.542(a)

(3) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.

(4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.

Test Procedure

According to ANSI C63.26-2015 Clause 5.2.3.4

The inherent randomness of the power peaks in a noise-like signal and the wide bandwidths associated with modern technologies makes it difficult to quantify the peak power using traditional measurement techniques. Because the peak power of a noise-like signal is predictable only on a statistical basis, a statistical measurement of the peak power is preferred.

CCDF curves provide a means for characterizing the power peaks of a noise-like signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation offers the capability to produce CCDF curves for a noise-like input signal.

See instrumentation-specific application literature for further guidance regarding use of the CCDF capability. The following guidelines are offered for performing a CCDF measurement.

- a) Set resolution/measurement bandwidth $\geq$ OBW or specified reference bandwidth.
- b) Set the number of counts to a value that stabilizes the measured CCDF curve.
- c) Set the measurement interval as follows:
 - 1) For continuous transmissions, set to the greater of $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ or 1 ms.
 - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
 - 3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
- d) Record the maximum PAPR level associated with a probability of 0.1%.
- e) The peak power level is calculated from the sum of the PAPR value from step d) to the measured average power.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2020-01-04	2021-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/04	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201048	Each time	N/A
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	Each time	N/A
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	N/A

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

Test Data**Environmental Conditions**

Temperature:	27.1~27.4 °C
Relative Humidity:	61 ~67%
ATM Pressure:	100.1~100.5kPa
Tester:	James Chen
Test Date:	2020-08-17~2020-08-23

Test Result: Compliance

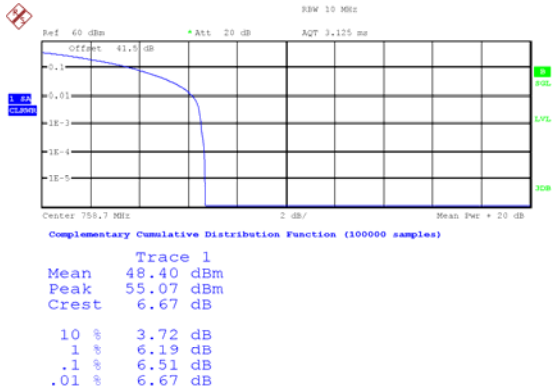
Conducted Output Power:

Antenna	Bandwidth	Test Modulation	Low Channel		Middle Channel		High Channel	
			Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
1	1.4M	QPSK	48.40	6.51	48.37	6.51	47.81	6.44
		16QAM	48.40	6.47	47.74	6.38	47.78	6.54
		64QAM	48.28	6.57	47.63	6.51	47.79	6.51
	3M	QPSK	47.65	6.47	47.42	6.47	47.72	6.60
		16QAM	48.25	6.03	47.91	6.09	48.29	6.15
		64QAM	47.48	6.47	47.70	6.51	47.79	6.60
	5M	QPSK	48.13	6.41	48.15	6.44	48.07	6.54
		16QAM	48.12	6.41	48.15	6.44	48.09	6.54
		64QAM	48.19	6.41	48.18	6.47	48.12	6.57
	10M	QPSK	/	/	47.91	7.40	/	/
		16QAM	/	/	47.95	7.37	/	/
		64QAM	/	/	47.92	7.47	/	/
4	1.4M	QPSK	47.51	6.51	47.60	6.51	46.88	6.48
		16QAM	47.68	6.51	48.35	6.51	47.21	6.51
		64QAM	47.54	6.57	48.35	6.47	46.80	6.64
	3M	QPSK	48.30	6.51	48.10	6.51	47.59	6.63
		16QAM	48.72	5.99	48.57	6.06	48.02	6.31
		64QAM	48.38	6.47	47.79	6.51	47.43	6.57
	5M	QPSK	47.62	6.44	48.02	6.41	47.65	6.63
		16QAM	48.09	6.35	47.87	6.41	47.56	6.60
		64QAM	48.01	6.38	47.76	6.51	47.54	6.67
	10M	QPSK	/	/	47.52	7.47	/	/
		16QAM	/	/	47.49	7.40	/	/
		64QAM	/	/	47.41	7.44	/	/

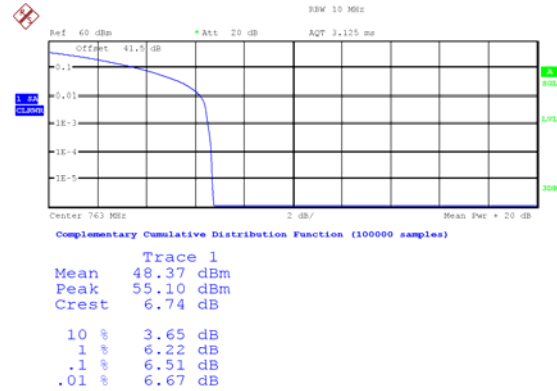
ERP:

Antenna	Bandwidth	Test Modulation	Low Channel	Middle Channel	High Channel
			Ave. Power (dBm)	Ave. Power (dBm)	Ave. Power (dBm)
1	1.4M	QPSK	56.25	56.22	55.66
		16QAM	56.25	55.59	55.63
		64QAM	56.13	55.48	55.64
	3M	QPSK	55.5	55.27	55.57
		16QAM	56.1	55.76	56.14
		64QAM	55.33	55.55	55.64
	5M	QPSK	55.98	56	55.92
		16QAM	55.97	56	55.94
		64QAM	56.04	56.03	55.97
	10M	QPSK	/	55.76	/
		16QAM	/	55.8	/
		64QAM	/	55.77	/
4	1.4M	QPSK	55.36	55.45	54.73
		16QAM	55.53	56.2	55.06
		64QAM	55.39	56.2	54.65
	3M	QPSK	56.15	55.95	55.44
		16QAM	56.57	56.42	55.87
		64QAM	56.23	55.64	55.28
	5M	QPSK	55.47	55.87	55.5
		16QAM	55.94	55.72	55.41
		64QAM	55.86	55.61	55.39
	10M	QPSK	/	55.37	/
		16QAM	/	55.34	/
		64QAM	/	55.26	/
MIMO	1.4M	QPSK	58.84	58.86	58.23
		16QAM	58.92	58.92	58.36
		64QAM	58.79	58.87	58.18
	3M	QPSK	58.85	58.63	58.52
		16QAM	59.35	59.11	59.02
		64QAM	58.81	58.61	58.47
	5M	QPSK	58.74	58.95	58.73
		16QAM	58.97	58.87	58.69
		64QAM	58.96	58.84	58.70
	10M	QPSK	/	58.58	/
		16QAM	/	58.59	/
		64QAM	/	58.53	/

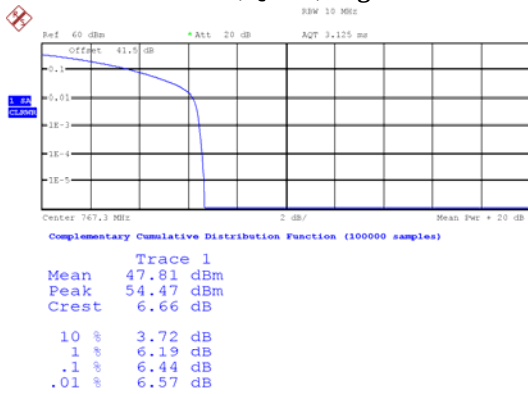
Note: ERP(dBm)=Conducted power(dBm)+Antenna Gain(dBi)-2.15

Antenna 1:**1.4MHz, QPSK, Low Channel**

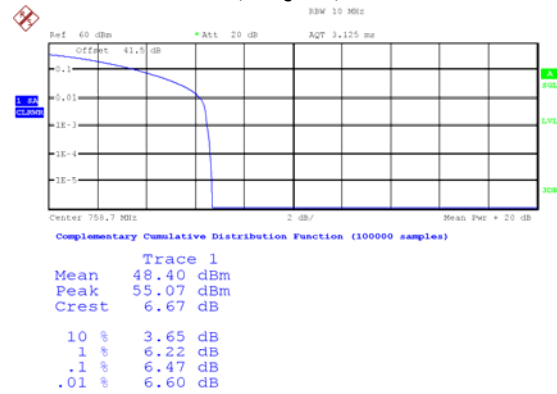
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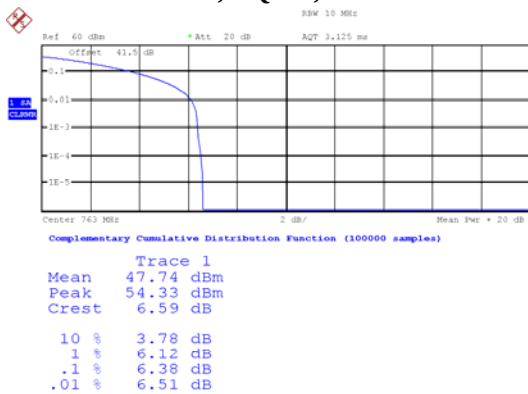
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1.4MHz, QPSK, High Channel

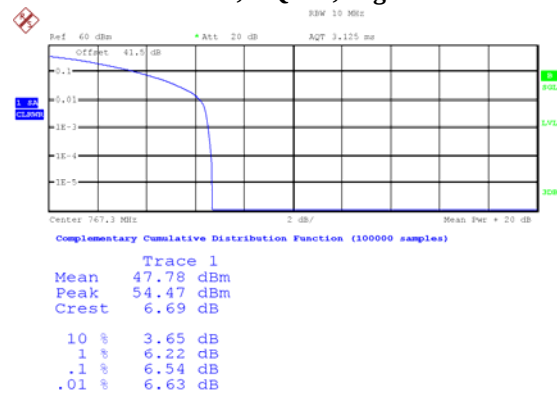
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1.4MHz, 16QAM, Low Channel

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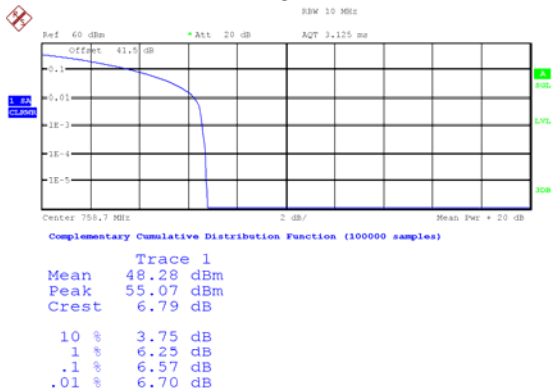
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1.4MHz, 16QAM, High Channel

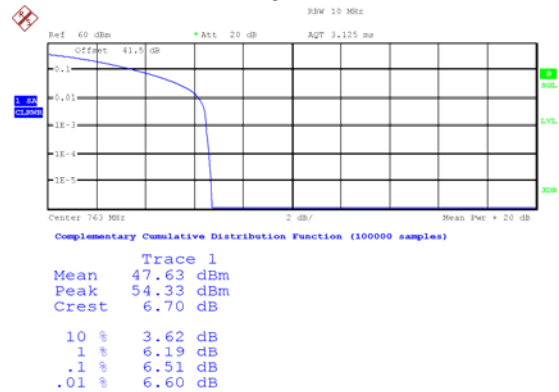
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1.4MHz, 64QAM, Low Channel



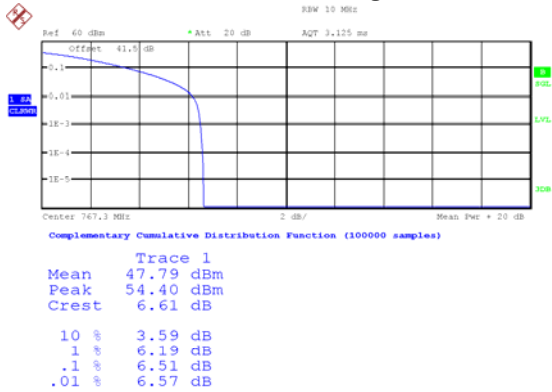
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1.4MHz, 64QAM, Middle Channel



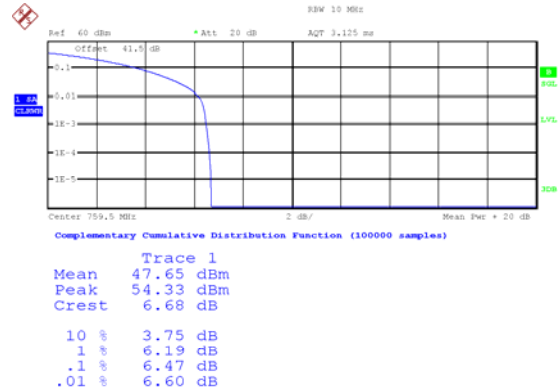
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1.4MHz, 64QAM, High Channel



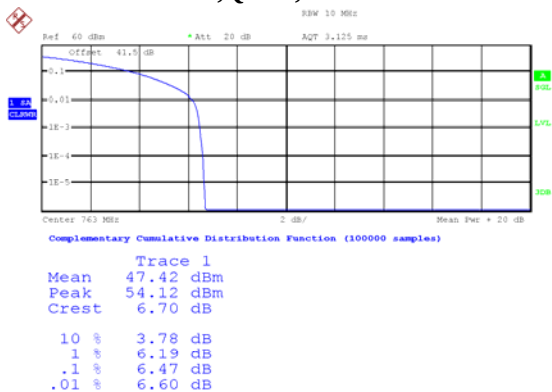
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3MHz, QPSK, Low Channel



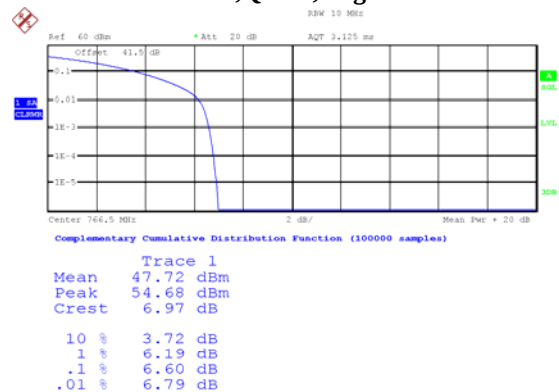
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3MHz, QPSK, Middle Channel

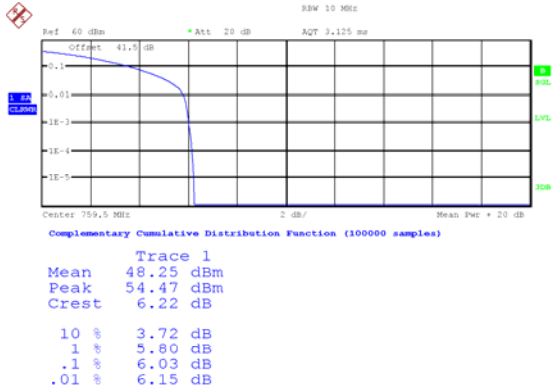


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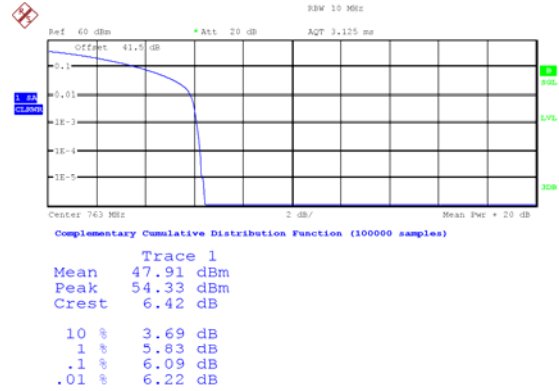
3MHz, QPSK, High Channel



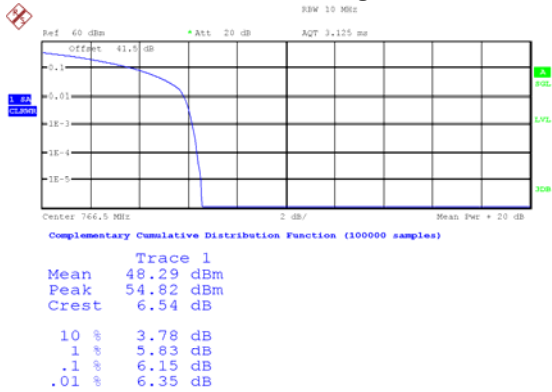
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3MHz,16QAM, Low Channel

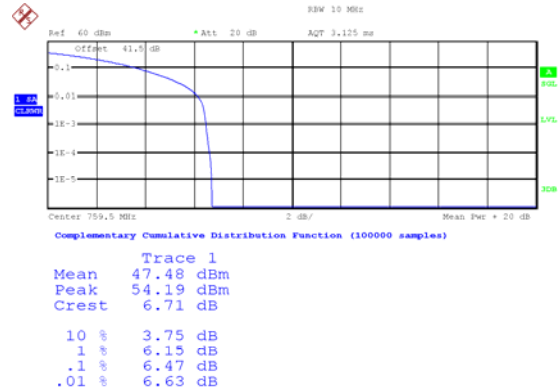
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3MHz,16QAM, Middle Channel

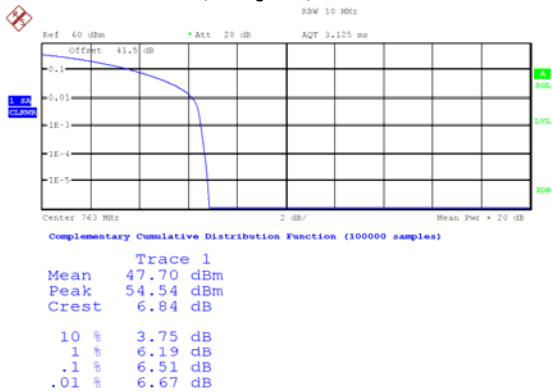
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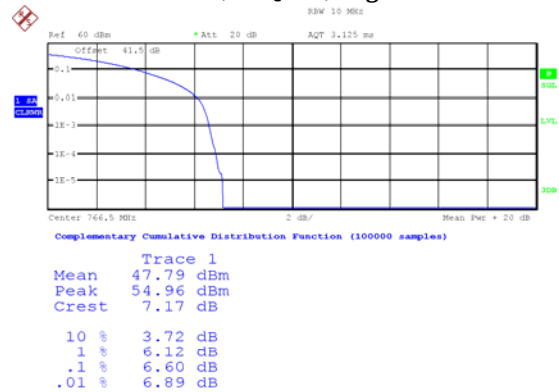
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3MHz, 64QAM, Low Channel

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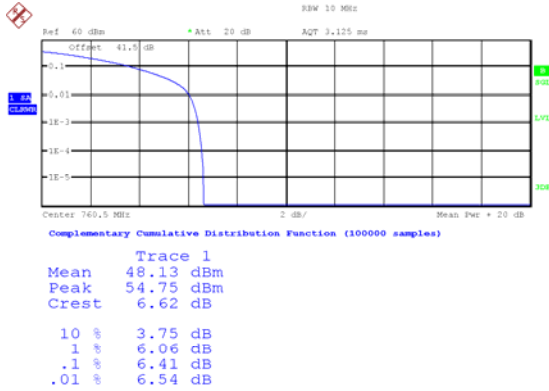
3MHz, 64QAM, Middle Channel

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3MHz, 64QAM, High Channel

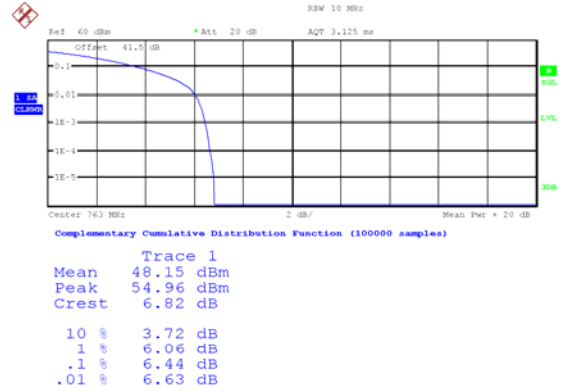
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5MHz, QPSK, Low Channel



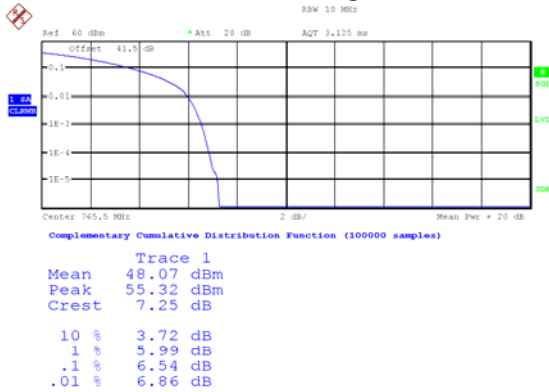
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5MHz, QPSK, Middle Channel



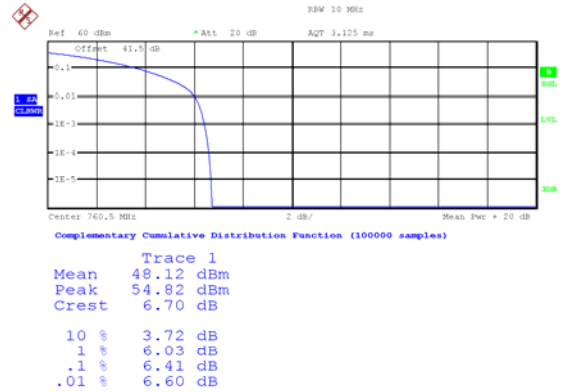
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5MHz, QPSK, High Channel



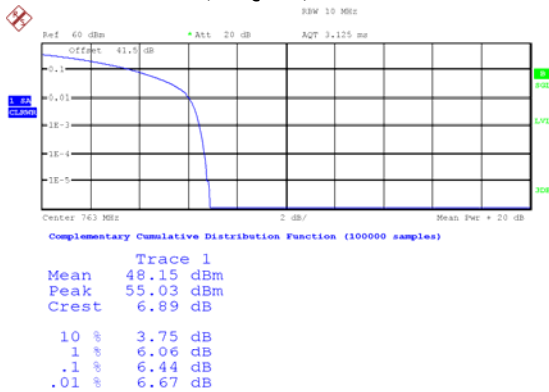
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5MHz, 16QAM, Low Channel



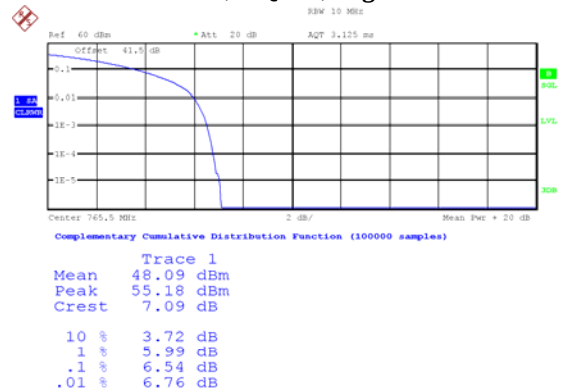
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5MHz, 16QAM, Middle Channel



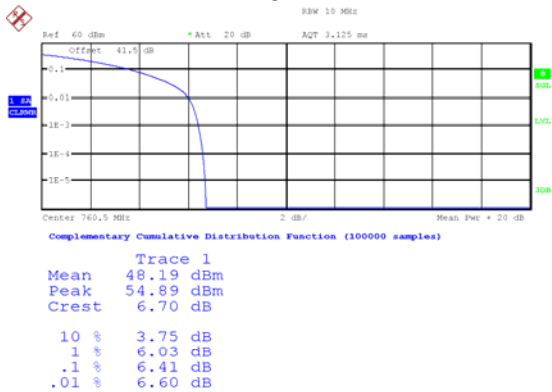
Date: 23.AUG.2020 14:59:30

5MHz, 16QAM, High Channel



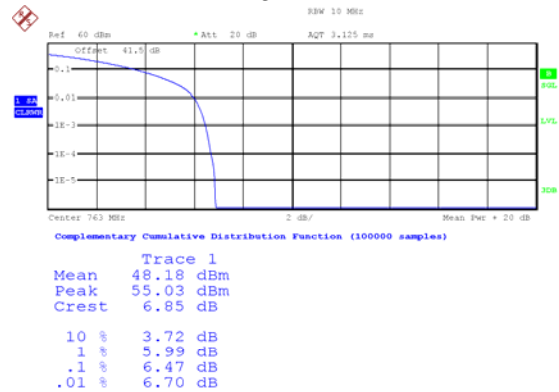
Date: 23.AUG.2020 15:53:55

5MHz, 64QAM, Low Channel



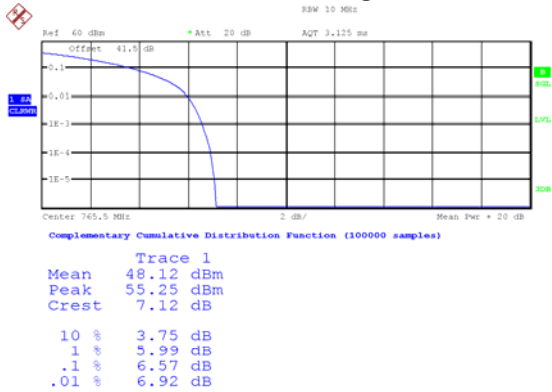
Date: 23.AUG.2020 14:17:43

5MHz, 64QAM, Middle Channel



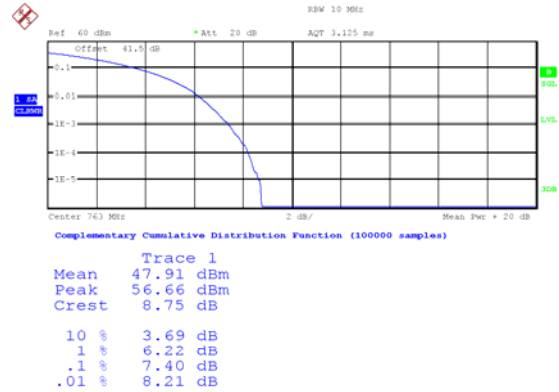
Date: 23.AUG.2020 15:13:34

5MHz, 64QAM, High Channel



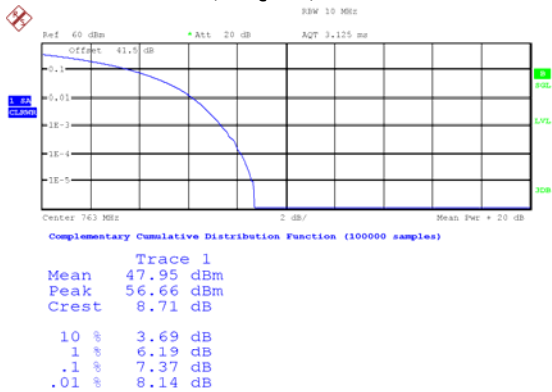
Date: 23.AUG.2020 16:11:01

10MHz, QPSK, Middle Channel



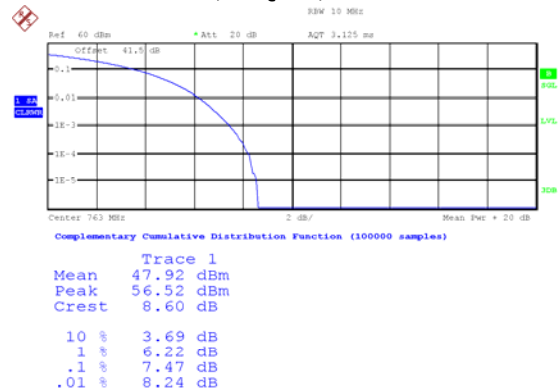
Date: 23.AUG.2020 16:38:26

10MHz, 16QAM, Middle Channel

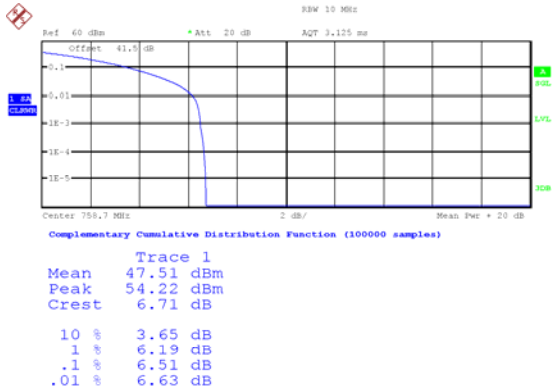


Date: 23.AUG.2020 16:53:15

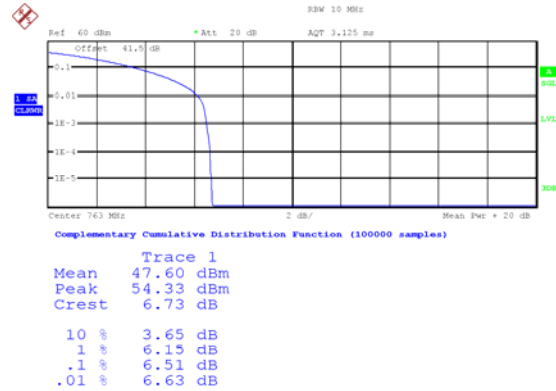
10MHz, 64QAM, Middle Channel



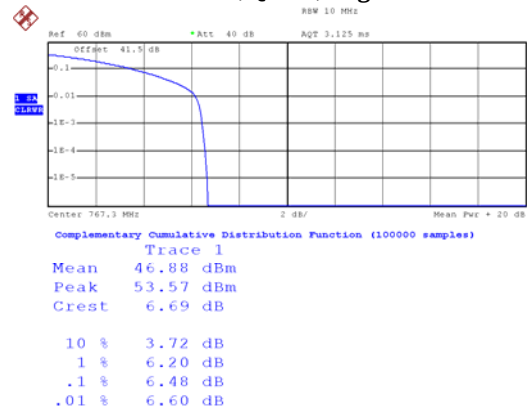
Date: 23.AUG.2020 17:13:31

Antenna 4:**1.4MHz, QPSK, Low Channel**

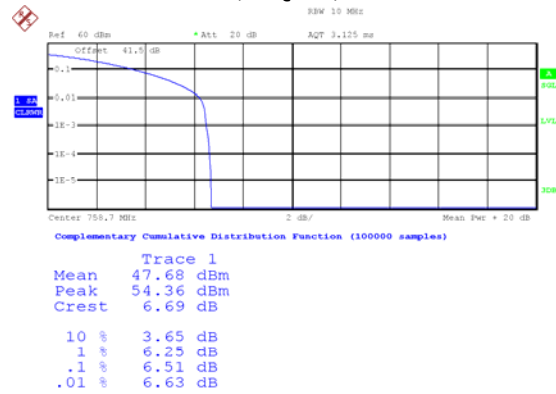
Date: 18.AUG.2020 21:01:50

1.4MHz, QPSK, Middle Channel

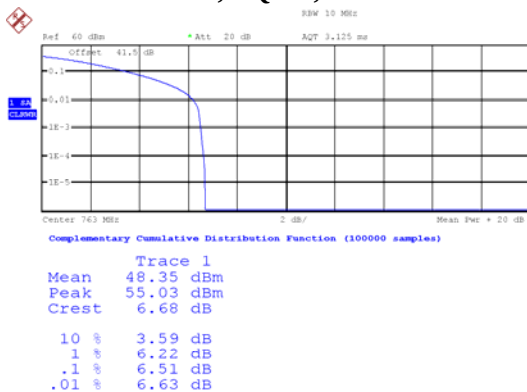
Date: 19.AUG.2020 20:24:26

1.4MHz, QPSK, High Channel

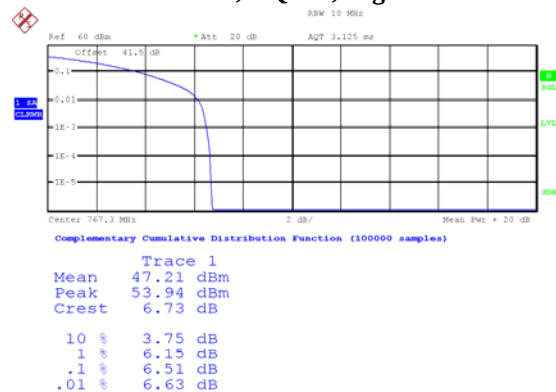
Date: 17.AUG.2020 21:44:45

1.4MHz, 16QAM, Low Channel

Date: 18.AUG.2020 21:56:24

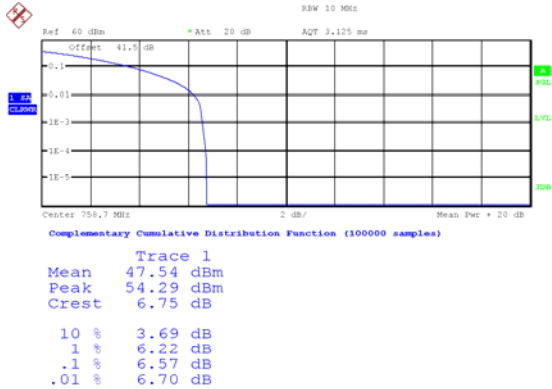
1.4MHz, 16QAM, Middle Channel

Date: 19.AUG.2020 20:54:28

1.4MHz, 16QAM, High Channel

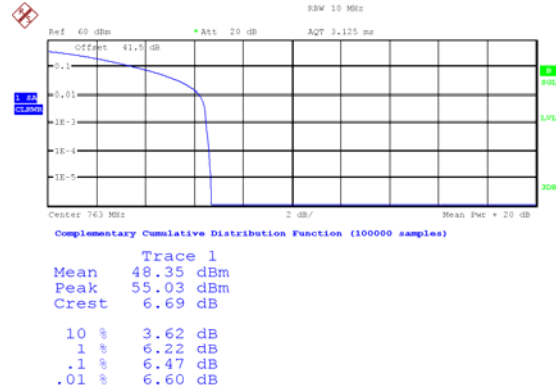
Date: 18.AUG.2020 20:28:18

1.4MHz, 64QAM, Low Channel



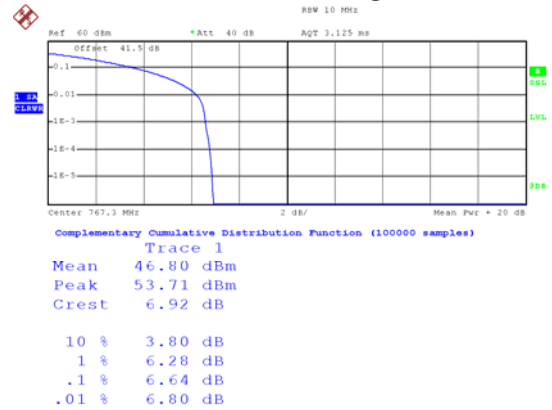
Date: 18.AUG.2020 22:37:21

1.4MHz, 64QAM, Middle Channel



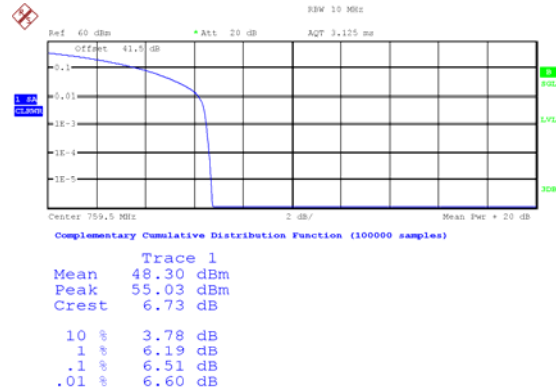
Date: 19.AUG.2020 21:22:43

1.4MHz, 64QAM, High Channel



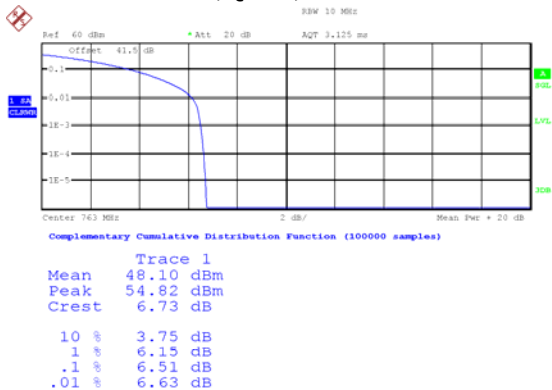
Date: 17.AUG.2020 20:39:03

3MHz, QPSK, Low Channel



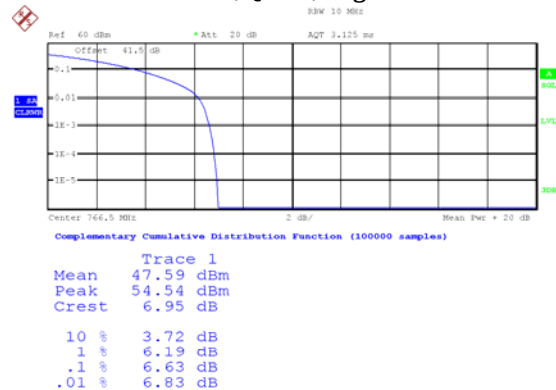
Date: 19.AUG.2020 21:51:47

3MHz, QPSK, Middle Channel

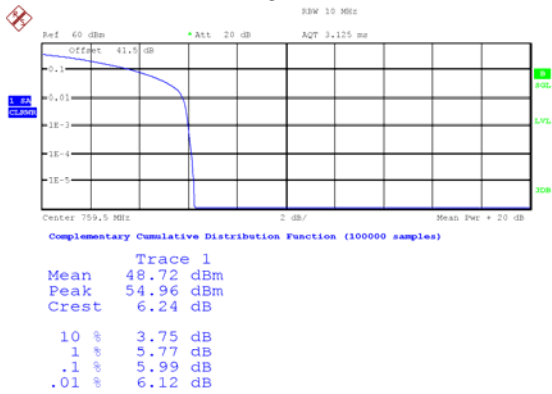


Date: 21.AUG.2020 19:38:49

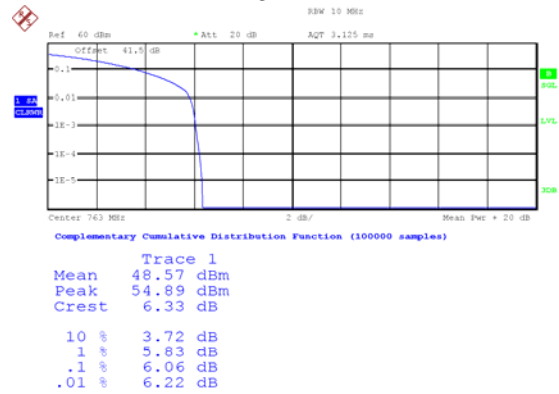
3MHz, QPSK, High Channel



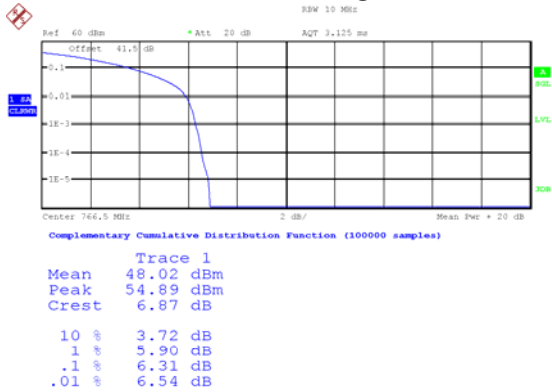
Date: 23.AUG.2020 11:12:24

3MHz,16QAM, Low Channel

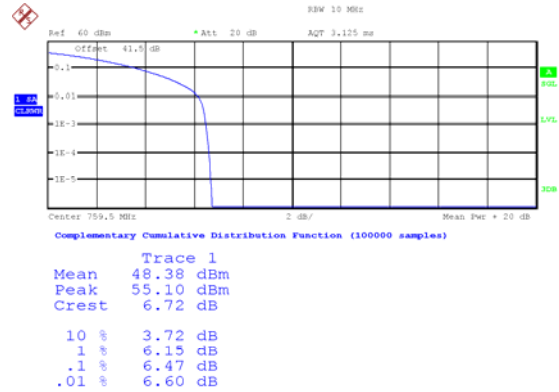
Date: 19.AUG.2020 22:37:10

3MHz,16QAM, Middle Channel

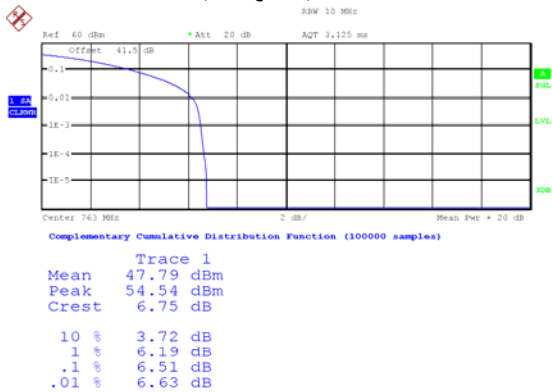
Date: 21.AUG.2020 20:06:09

3MHz,16QAM, High Channel

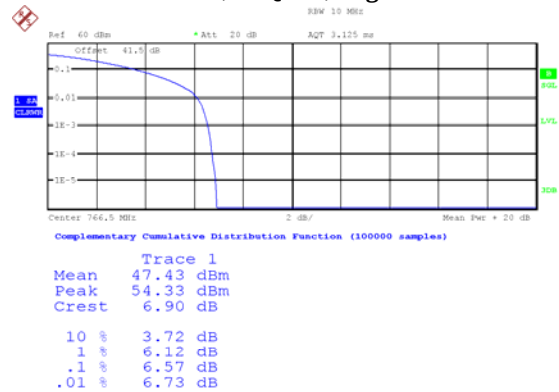
Date: 23.AUG.2020 11:32:55

3MHz, 64QAM, Low Channel

Date: 21.AUG.2020 18:39:27

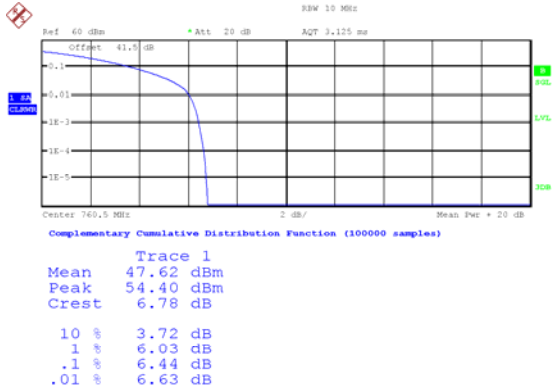
3MHz, 64QAM, Middle Channel

Date: 23.AUG.2020 10:45:49

3MHz, 64QAM, High Channel

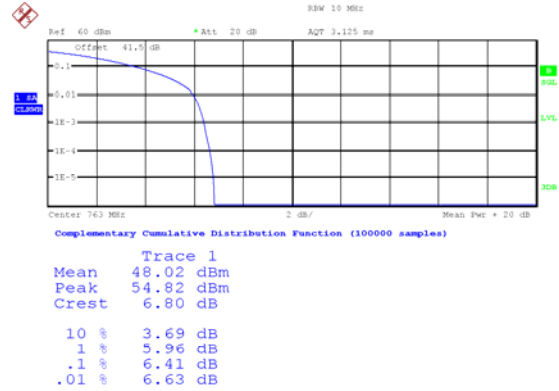
Date: 23.AUG.2020 11:54:15

5MHz, QPSK, Low Channel



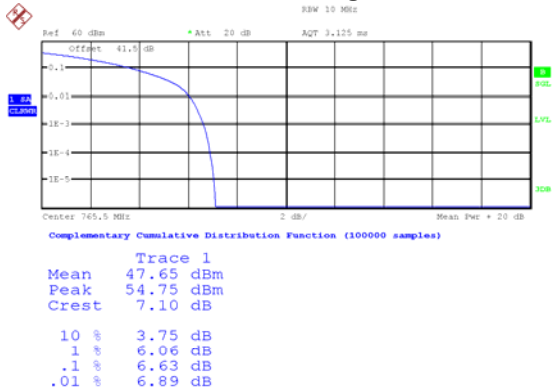
Date: 23.AUG.2020 12:23:05

5MHz, QPSK, Middle Channel



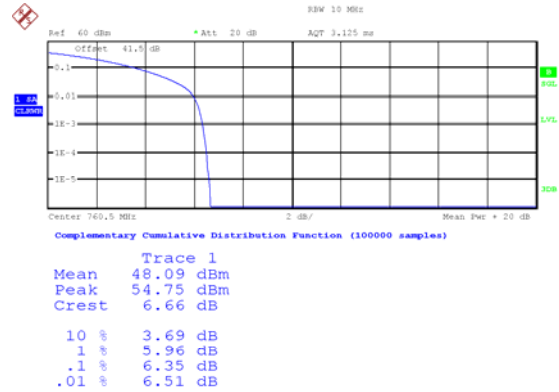
Date: 23.AUG.2020 14:41:29

5MHz, QPSK, High Channel



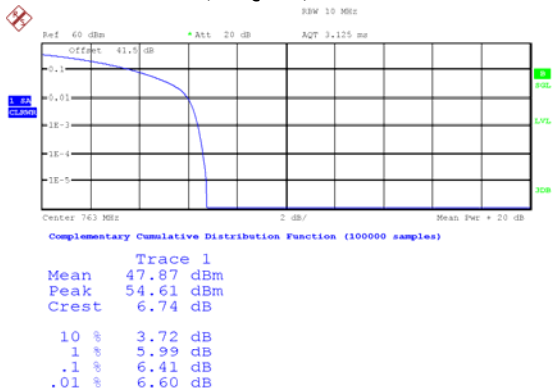
Date: 23.AUG.2020 15:16:39

5MHz, 16QAM, Low Channel



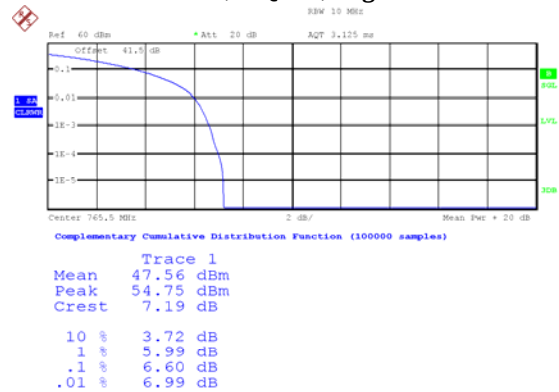
Date: 23.AUG.2020 14:01:27

5MHz, 16QAM, Middle Channel



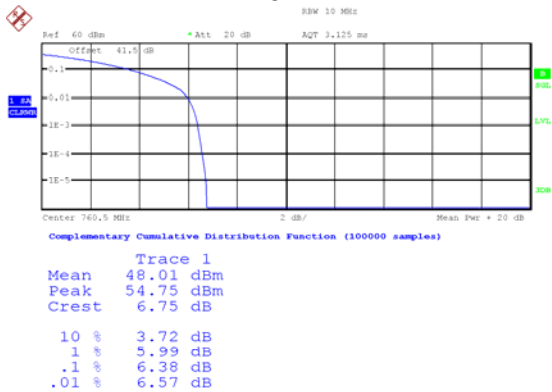
Date: 23.AUG.2020 15:00:01

5MHz, 16QAM, High Channel



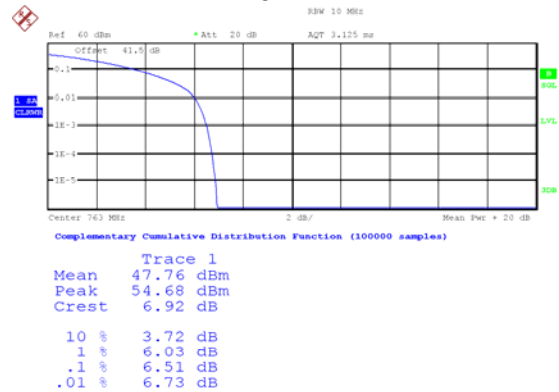
Date: 23.AUG.2020 15:54:29

5MHz, 64QAM, Low Channel



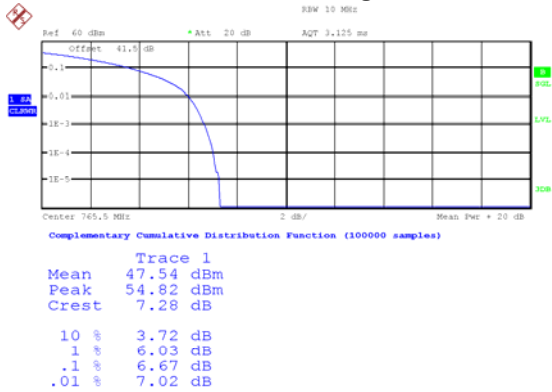
Date: 23.AUG.2020 14:18:11

5MHz, 64QAM, Middle Channel



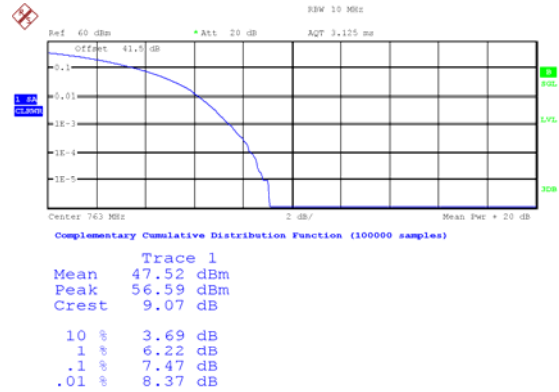
Date: 23.AUG.2020 15:13:01

5MHz, 64QAM, High Channel



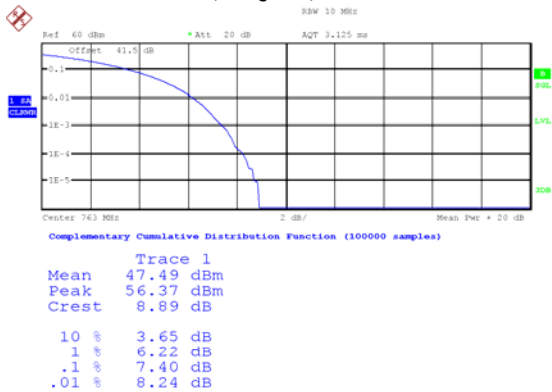
Date: 23.AUG.2020 16:11:35

10MHz,QPSK, Middle Channel



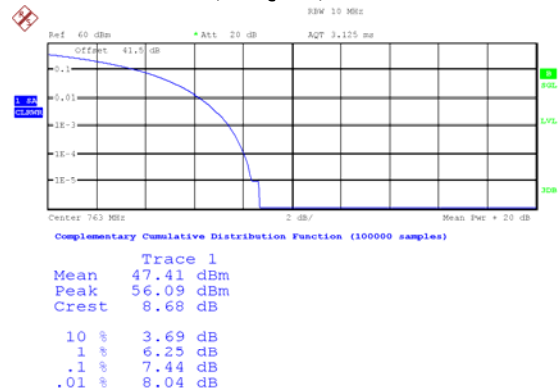
Date: 23.AUG.2020 16:39:00

10MHz,16QAM, Middle Channel



Date: 23.AUG.2020 16:52:48

10MHz, 64QAM, Middle Channel



Date: 23.AUG.2020 17:13:56

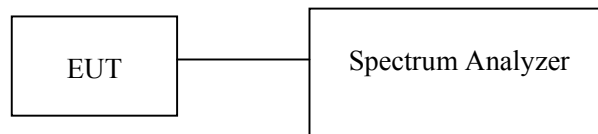
FCC §2.1049- OCCUPIED BANDWIDTH**Applicable Standard**

FCC §2.1049.

Test Procedure

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

The 26 dB & 99% bandwidth was recorded.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2020-01-04	2021-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/04	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201048	Each time	N/A
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	Each time	N/A

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

Test Data**Environmental Conditions**

Temperature:	27.1~27.4 °C
Relative Humidity:	61 ~67%
ATM Pressure:	100.1~100.5kPa
Tester:	James Chen
Test Date:	2020-08-17~2020-08-23

Test Mode: Transmitting

Test Result: Compliance. Please refer to the following table and plots.

Antenna	Bandwidth	Test Modulation	Bandwidth(MHz)					
			Low Channel		Middle Channel		High Channel	
			99%	26dB	99%	26dB	99%	26dB
1	1.4M	QPSK	1.120	1.284	1.122	1.287	1.120	1.287
		16QAM	1.115	1.287	1.115	1.287	1.115	1.285
		64QAM	1.120	1.284	1.115	1.287	1.115	1.280
	3M	QPSK	2.702	2.904	2.692	2.896	2.692	2.890
		16QAM	2.702	2.910	2.702	2.910	2.702	2.904
		64QAM	2.712	2.906	2.702	2.900	2.712	2.910
	5M	QPSK	4.519	4.808	4.519	4.821	4.503	4.801
		16QAM	4.487	4.833	4.503	4.830	4.503	4.833
		64QAM	4.519	4.843	4.519	4.833	4.503	4.833
	10M	QPSK	/	/	8.974	9.471	/	/
		16QAM	/	/	8.974	9.526	/	/
		64QAM	/	/	8.974	9.494	/	/
4	1.4M	QPSK	1.116	1.277	1.116	1.277	1.116	1.278
		16QAM	1.115	1.291	1.115	1.287	1.115	1.291
		64QAM	1.115	1.282	1.115	1.282	1.116	1.282
	3M	QPSK	2.692	2.894	2.692	2.896	2.692	2.890
		16QAM	2.702	2.913	2.702	2.904	2.702	2.898
		64QAM	2.712	2.900	2.712	2.900	2.702	2.904
	5M	QPSK	4.503	4.808	4.503	4.801	4.519	4.833
		16QAM	4.503	4.840	4.487	4.821	4.503	4.817
		64QAM	4.503	4.837	4.503	4.840	4.519	4.833
	10M	QPSK	/	/	8.974	9.516	/	/
		16QAM	/	/	8.974	9.519	/	/
		64QAM	/	/	8.974	9.538	/	/

1.4MHz, QPSK, Low Channel



Date: 19.AUG.2020 20:20:04

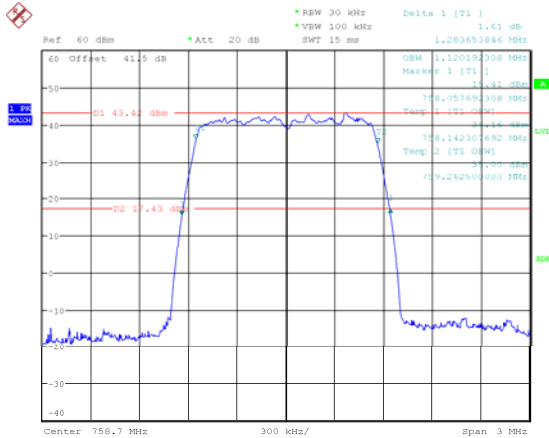
Date: 23.AUG.2020 17:47:40

Date: 18.AUG.2020 21:55:09

Date: 19.AUG.2020 20:52:22

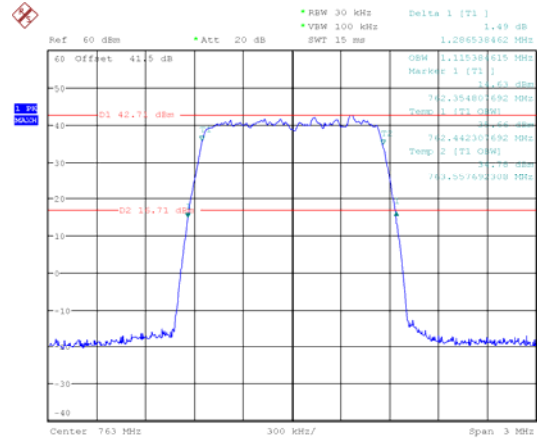
Date: 23.AUG.2020 17:42:49

1.4MHz, 64QAM, Low Channel



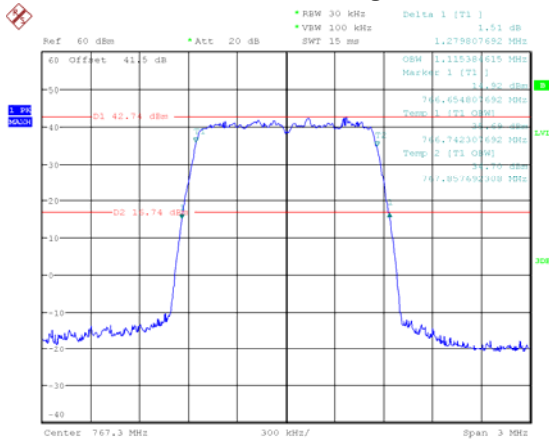
Date: 18.AUG.2020 22:34:25

1.4MHz, 64QAM, Middle Channel



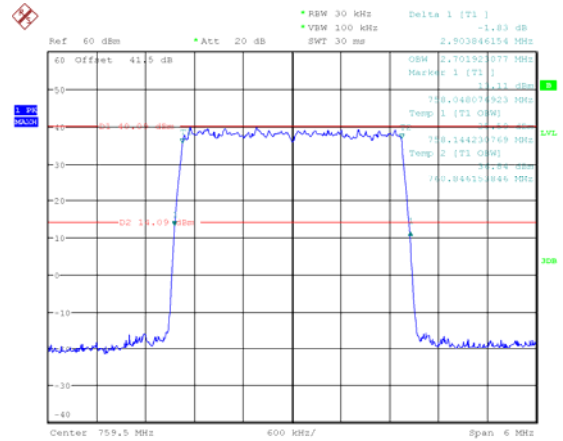
Date: 19.AUG.2020 21:28:56

1.4MHz, 64QAM, High Channel



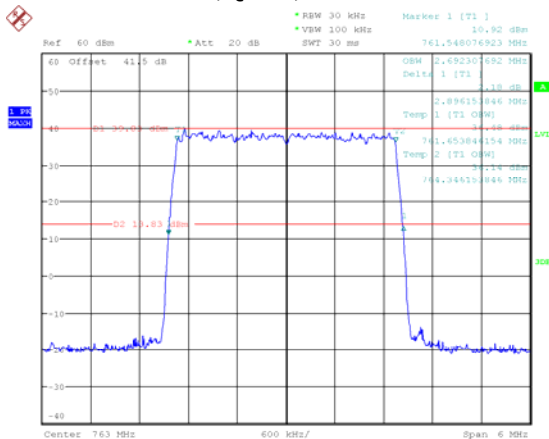
Date: 23.AUG.2020 17:44:33

3MHz, QPSK, Low Channel



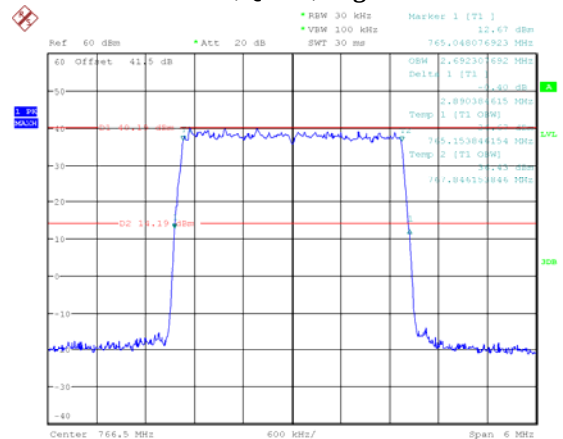
Date: 19.AUG.2020 21:54:50

3MHz, QPSK, Middle Channel



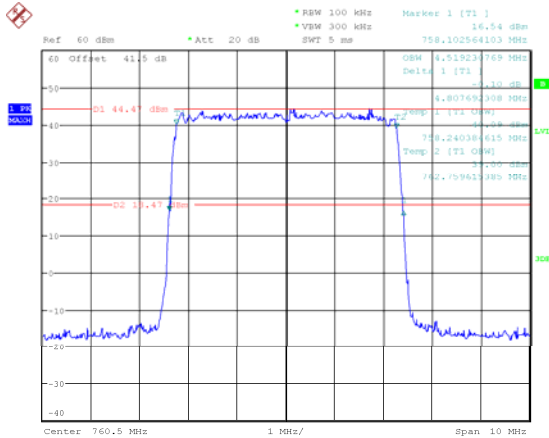
Date: 21.AUG.2020 19:35:16

3MHz, QPSK, High Channel



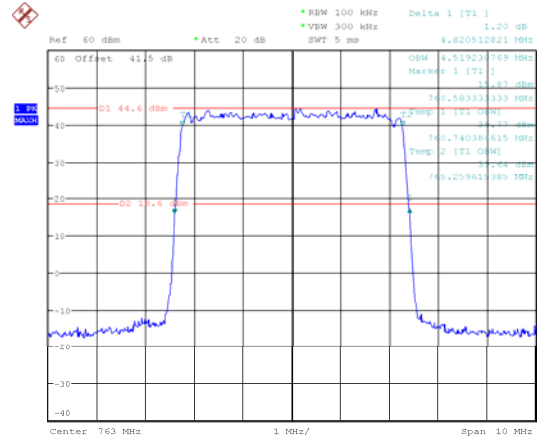
Date: 23.AUG.2020 11:14:05

5MHz, QPSK, Low Channel



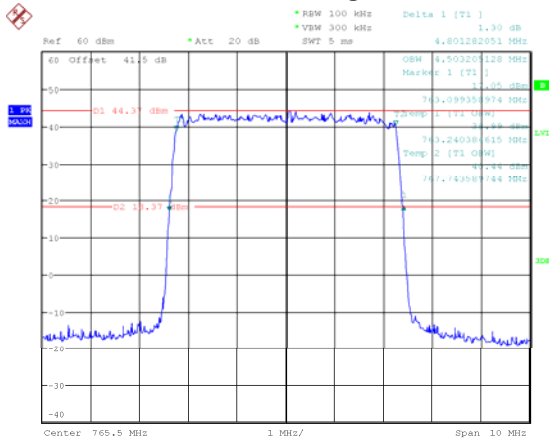
Date: 23.AUG.2020 12:22:03

5MHz, QPSK, Middle Channel



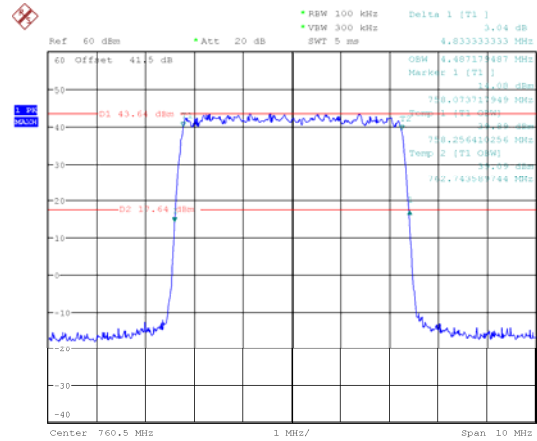
Date: 23.AUG.2020 14:44:32

5MHz, QPSK, High Channel



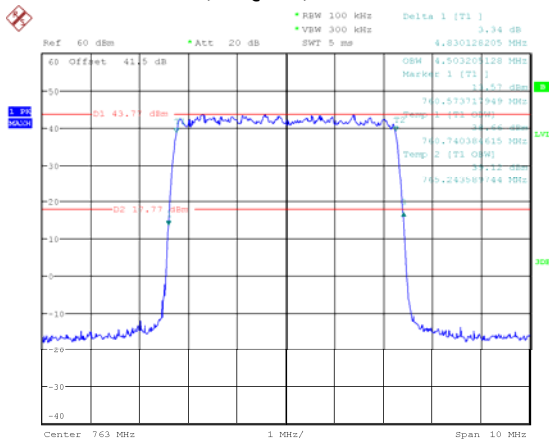
Date: 23.AUG.2020 15:40:00

5MHz, 16QAM, Low Channel



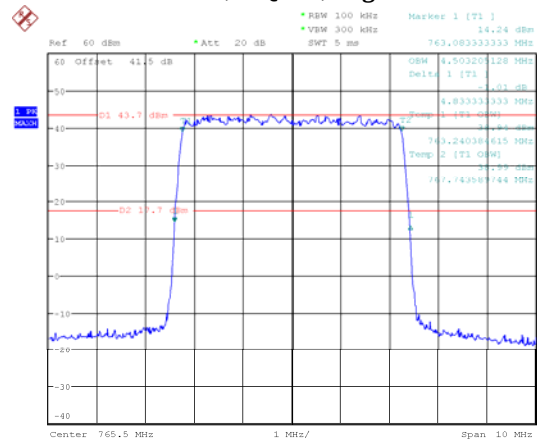
Date: 23.AUG.2020 14:03:04

5MHz, 16QAM, Middle Channel



Date: 23.AUG.2020 14:58:07

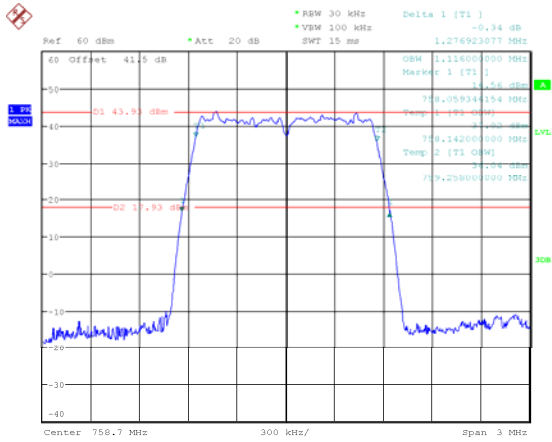
5MHz, 16QAM, High Channel



Date: 23.AUG.2020 15:52:08

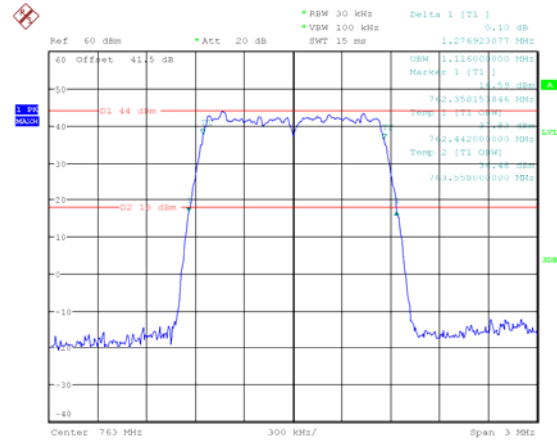
Antenna 4:

1.4MHz, QPSK, Low Channel



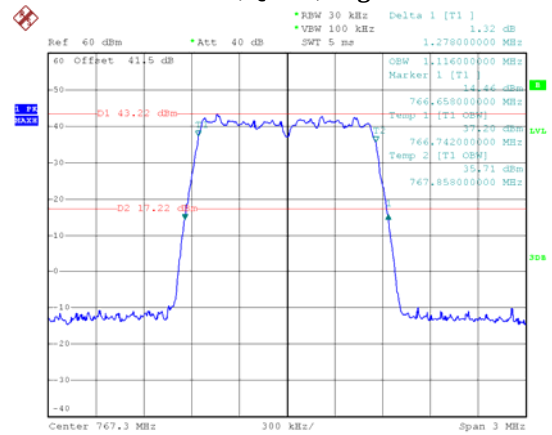
Date: 18.AUG.2020 21:01:15

1.4MHz, QPSK, Middle Channel



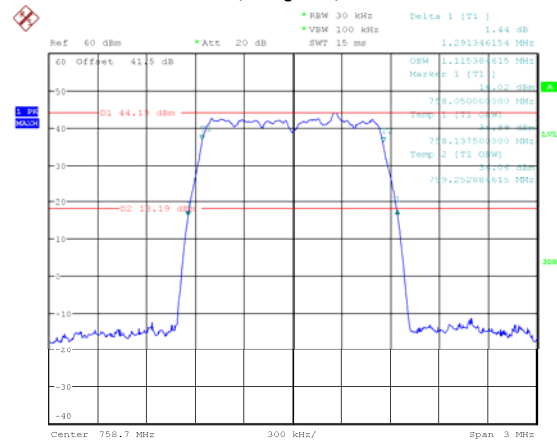
Date: 19.AUG.2020 20:23:54

1.4MHz, QPSK, High Channel



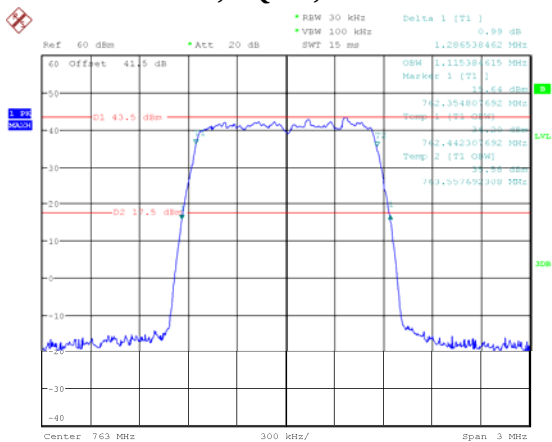
Date: 17.AUG.2020 21:43:02

1.4MHz, 16QAM, Low Channel



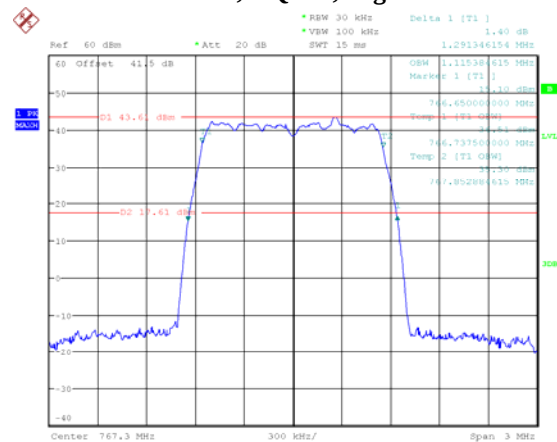
Date: 18.AUG.2020 21:53:22

1.4MHz, 16QAM, Middle Channel



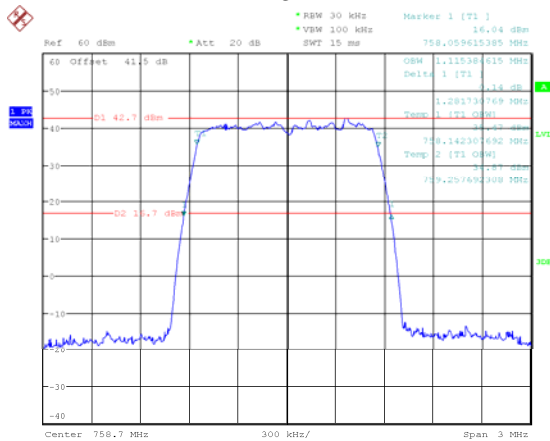
Date: 19.AUG.2020 20:53:54

1.4MHz, 16QAM, High Channel



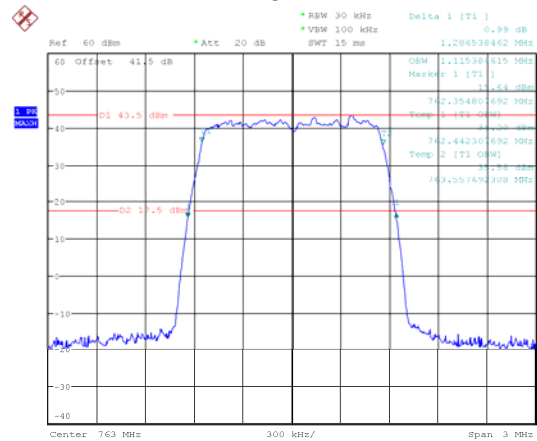
Date: 18.AUG.2020 20:27:42

1.4MHz, 64QAM, Low Channel



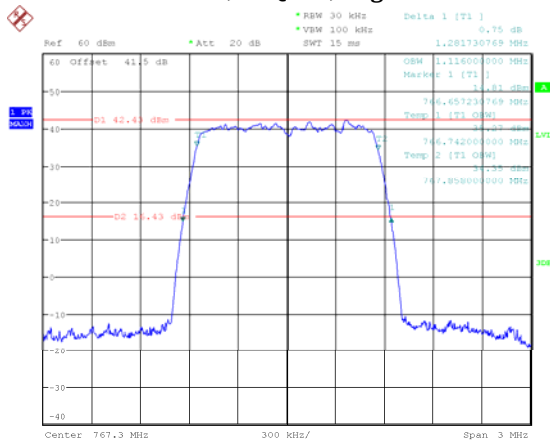
Date: 18.AUG.2020 22:32:37

1.4MHz, 64QAM, Middle Channel



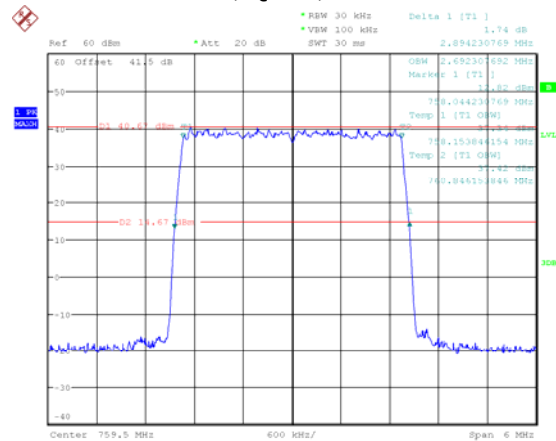
Date: 19.AUG.2020 20:53:54

1.4MHz, 64QAM, High Channel



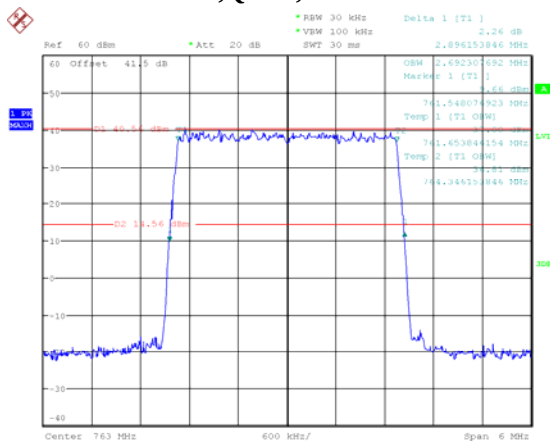
Date: 18.AUG.2020 20:02:07

3MHz, QPSK, Low Channel



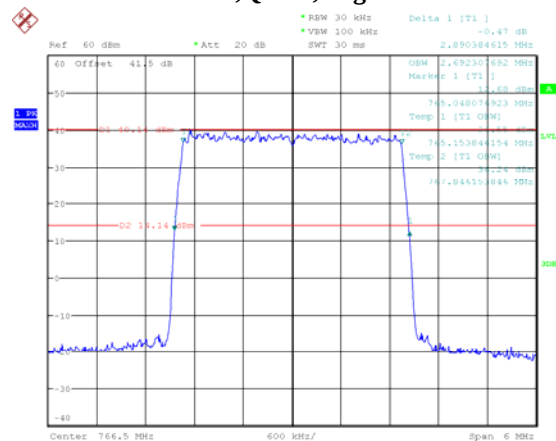
Date: 19.AUG.2020 21:49:44

3MHz,QPSK, Middle Channel



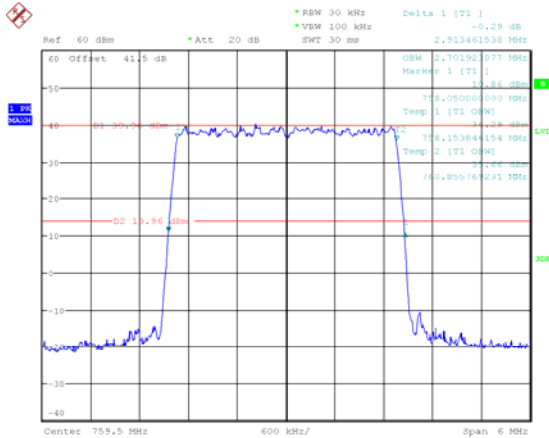
Date: 21.AUG.2020 19:33:55

3MHz,QPSK, High Channel



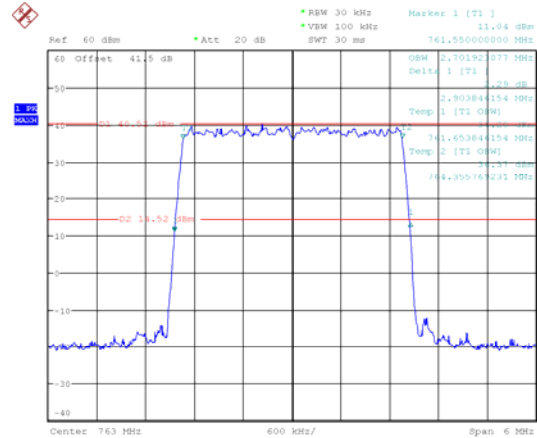
Date: 23.AUG.2020 11:11:45

3MHz,16QAM, Low Channel



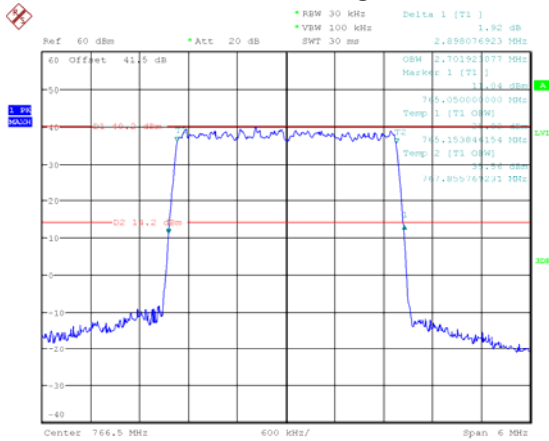
Date: 19.AUG.2020 22:36:26

3MHz,16QAM, Middle Channel



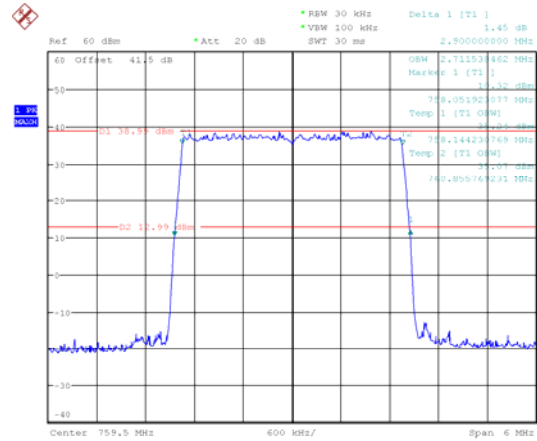
Date: 21.AUG.2020 20:05:44

3MHz,16QAM, High Channel



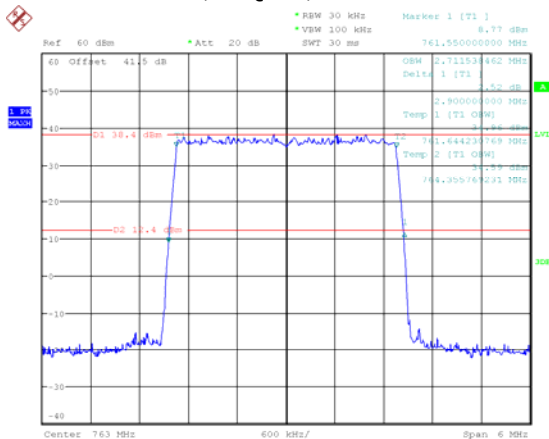
Date: 23.AUG.2020 11:29:00

3MHz, 64QAM, Low Channel



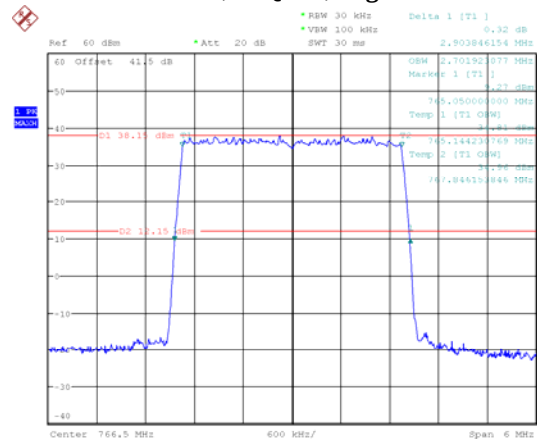
Date: 21.AUG.2020 18:08:07

3MHz, 64QAM, Middle Channel



Date: 23.AUG.2020 10:44:18

3MHz, 64QAM, High Channel



Date: 23.AUG.2020 11:53:40

Date: 23.AUG.2020 12:20:52

Date: 23.AUG.2020 14:45:42

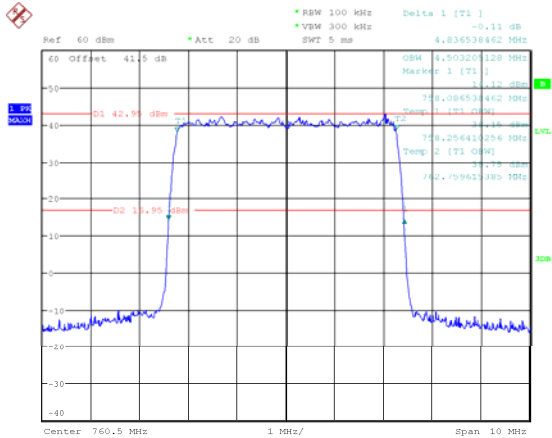
Date: 23.AUG.2020 15:38:52

Date: 23.AUG.2020 14:01:08

Date: 23.AUG.2020 14:56:48

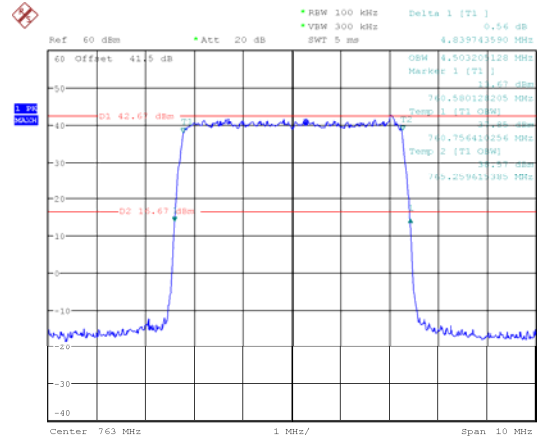
Date: 23.AUG.2020 15:50:26

5MHz, 64QAM, Low Channel



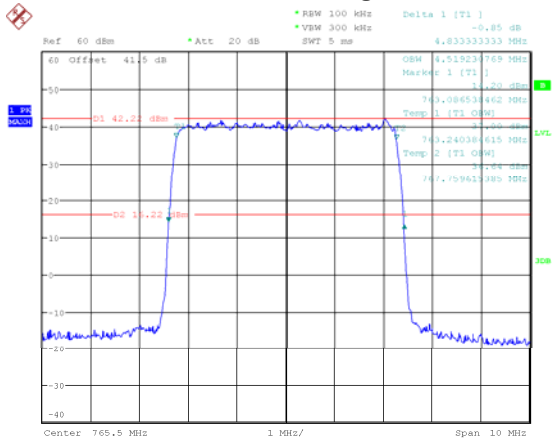
Date: 23.AUG.2020 14:15:35

5MHz, 64QAM, Middle Channel



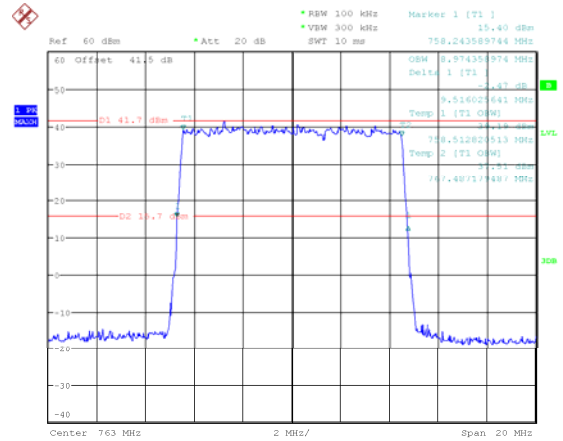
Date: 23.AUG.2020 15:16:59

5MHz, 64QAM, High Channel



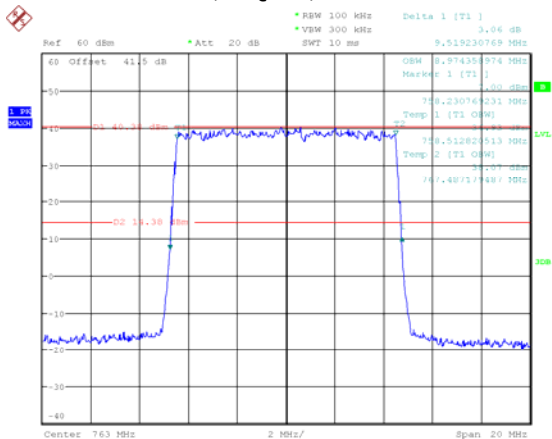
Date: 23.AUG.2020 16:13:30

10MHz,QPSK, Middle Channel



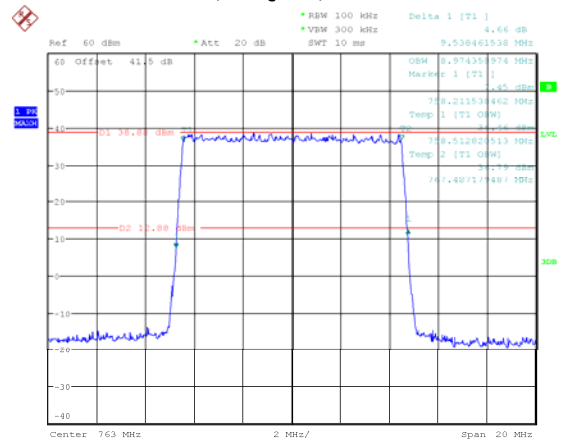
Date: 23.AUG.2020 16:35:28

10MHz,16QAM, Middle Channel



Date: 23.AUG.2020 16:56:42

10MHz, 64QAM, Middle Channel



Date: 23.AUG.2020 17:10:34

FCC §2.1051& §90.543- SPURIOUS EMISSIONS AT ANTENNA TERMINALS**Applicable Standard**

FCC §2.1051, and §90.543.

(e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.

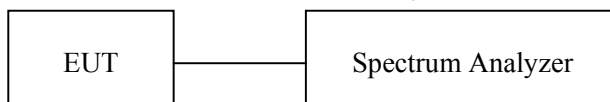
(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2020-01-04	2021-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/04	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201048	Each time	N/A
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	0E01203239	Each time	N/A

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

Test Data**Environmental Conditions**

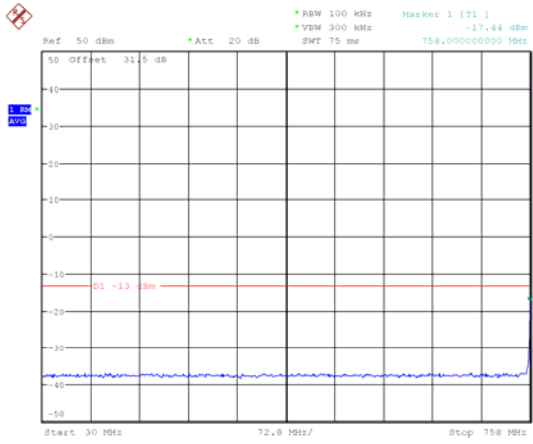
Temperature:	27.1~27.4 °C
Relative Humidity:	61 ~67%
ATM Pressure:	100.1~100.5kPa
Tester:	James Chen
Test Date:	2020-08-17~2020-08-23

Test mode: Transmitting

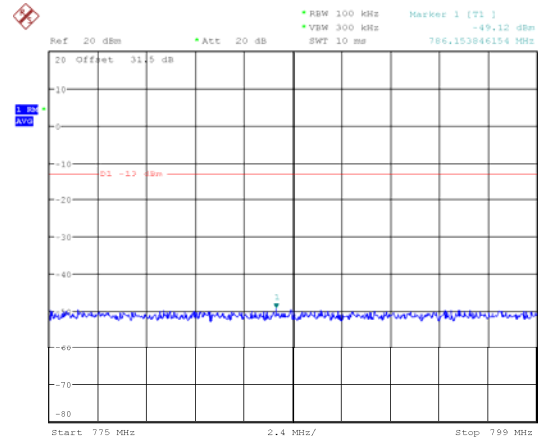
Test Result: Compliance. Test performed at QPSK modulation. Please refer to the following plots.

Antenna 1:

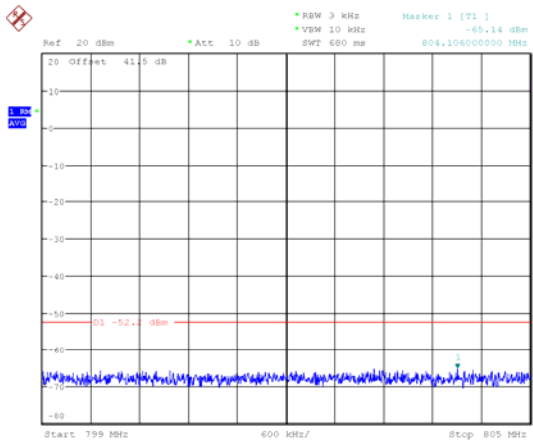
1.4M Low Channel



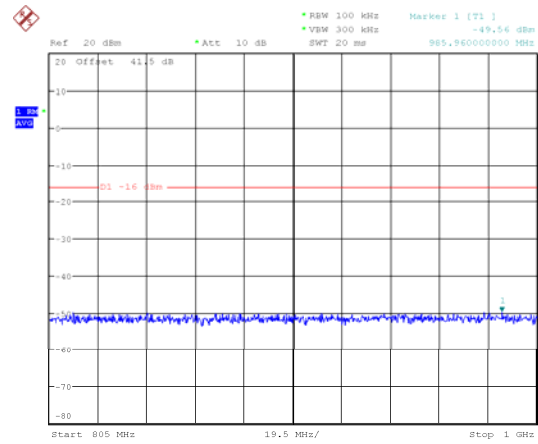
Date: 24.AUG.2020 21:24:41



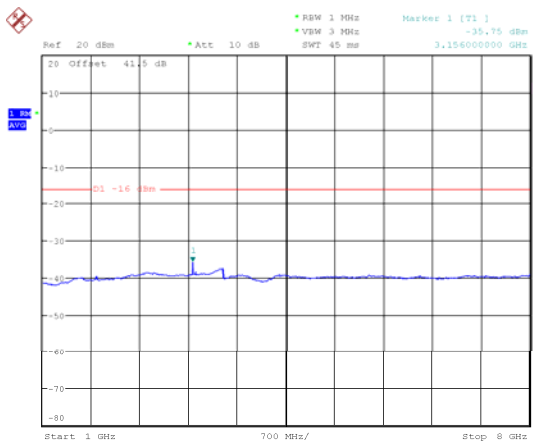
Date: 24.AUG.2020 21:27:00



Date: 18.AUG.2020 21:37:07

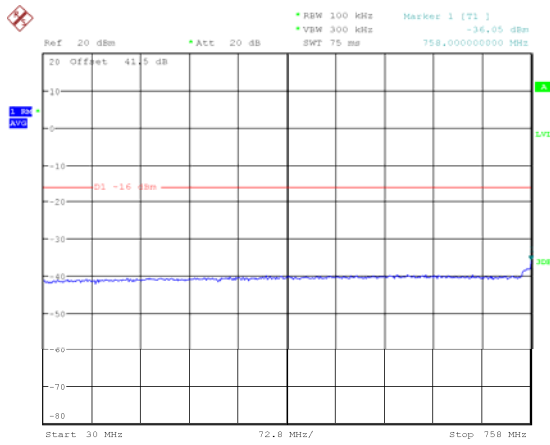


Date: 18.AUG.2020 21:37:53

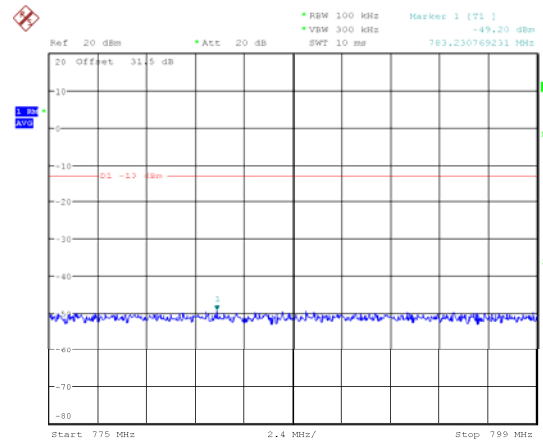


Date: 18.AUG.2020 21:38:56

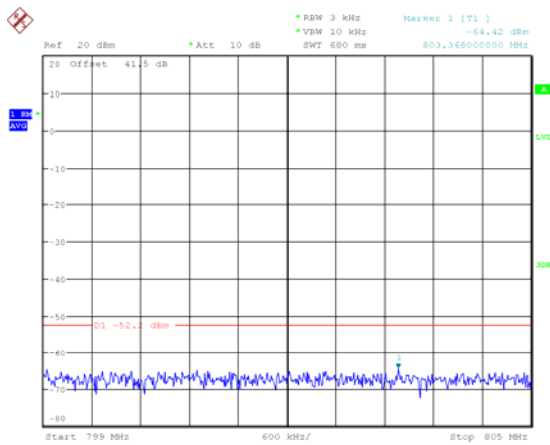
1.4M Middle Channel



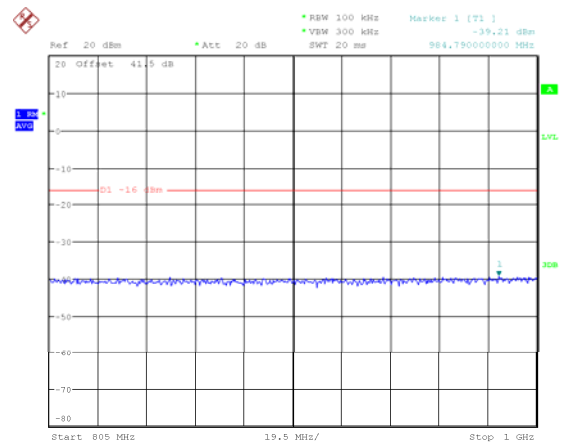
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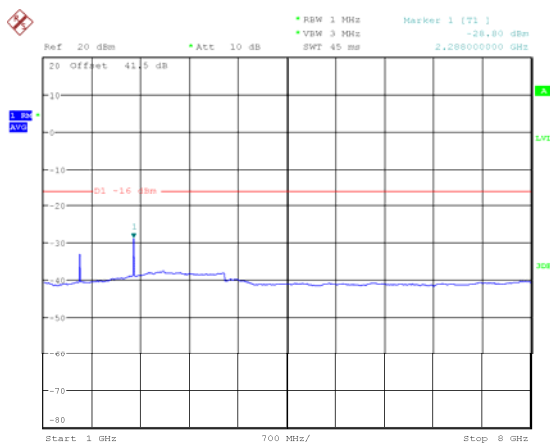
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Date: 19.AUG.2020 20:38:50

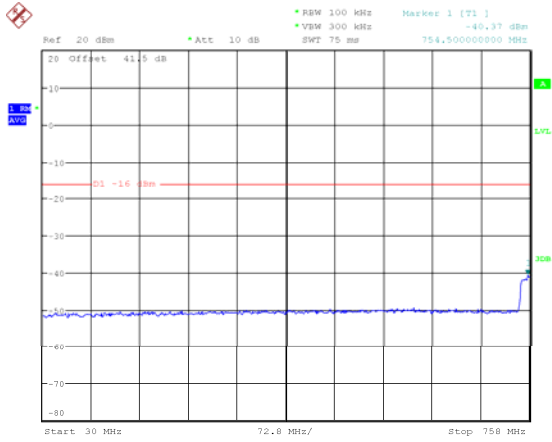


Date: 19.AUG.2020 20:39:21

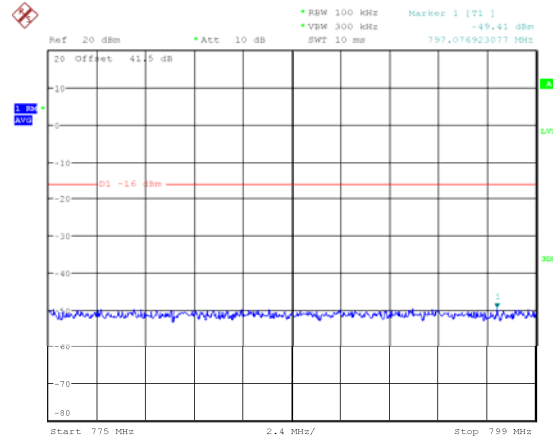


Date: 19.AUG.2020 20:35:52

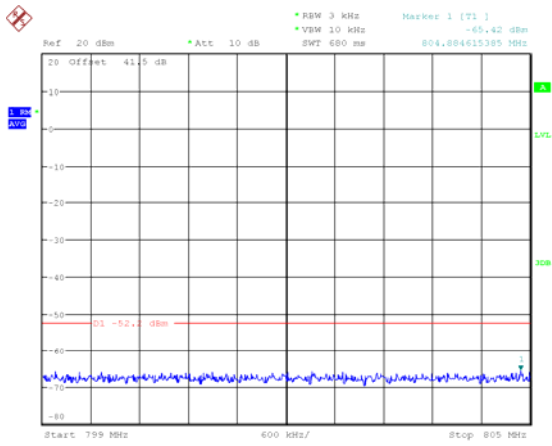
1.4M High Channel



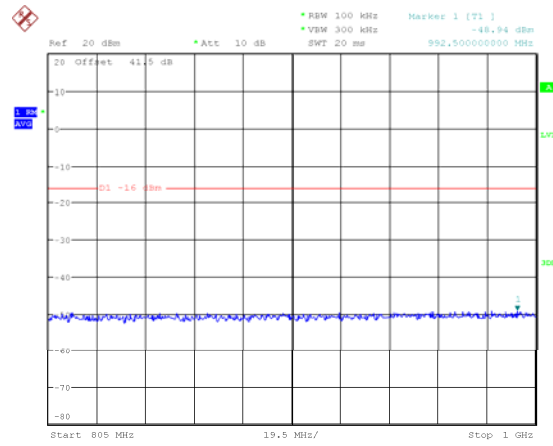
Date: 23.AUG.2020 17:50:12



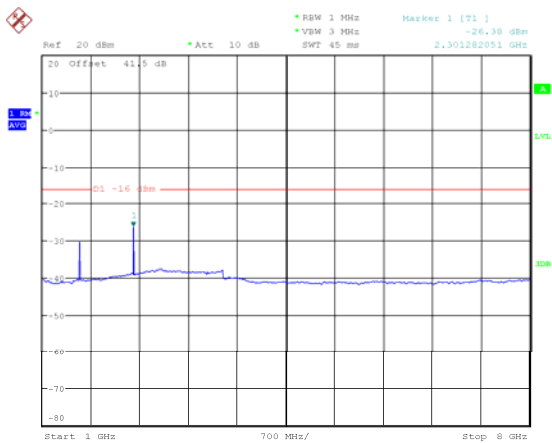
Date: 23.AUG.2020 17:51:12



Date: 23.AUG.2020 17:51:43

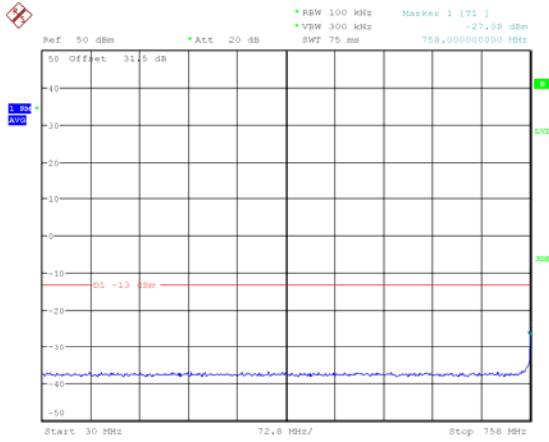


Date: 23.AUG.2020 17:53:55

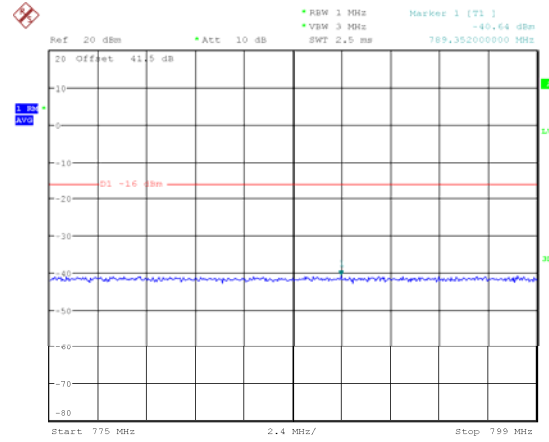


Date: 23.AUG.2020 17:54:12

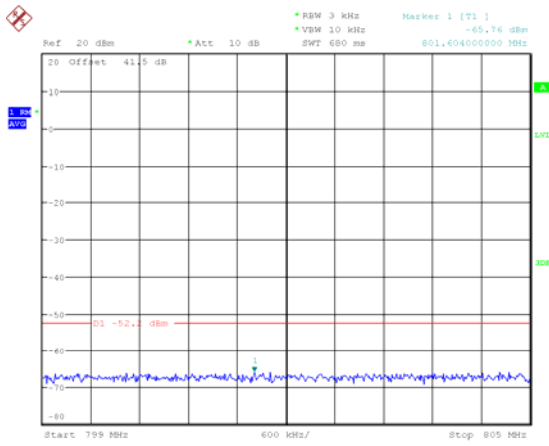
3M Low Channel



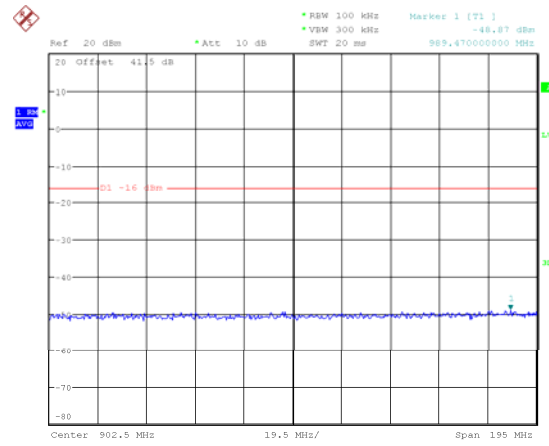
Date: 24.AUG.2020 21:51:34



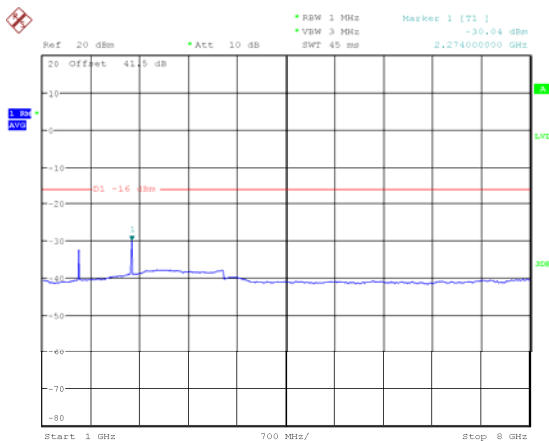
Date: 19.AUG.2020 22:20:35



Date: 19.AUG.2020 22:21:13

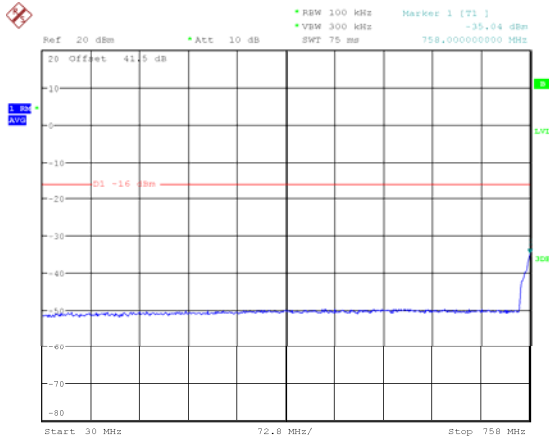


Date: 19.AUG.2020 22:23:00

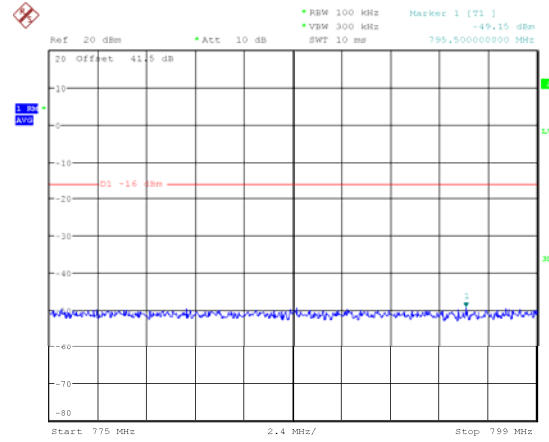


Date: 19.AUG.2020 22:22:17

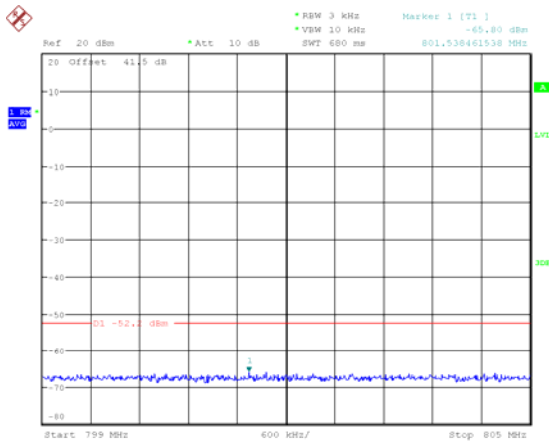
3M Middle Channel



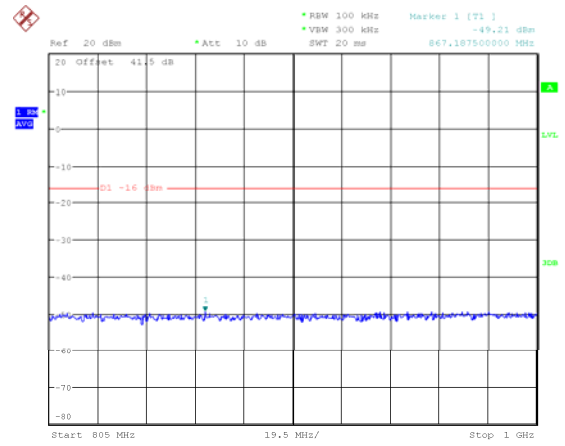
Date: 21.AUG.2020 19:46:11



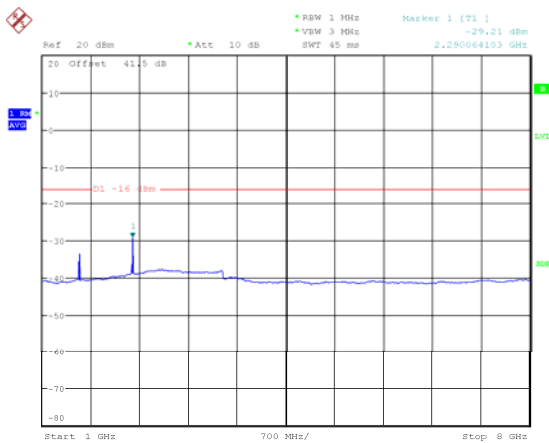
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Date: 21.AUG.2020 19:53:50

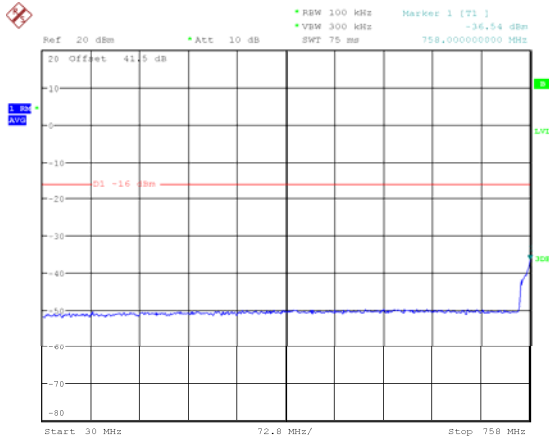


Date: 21.AUG.2020 19:55:01

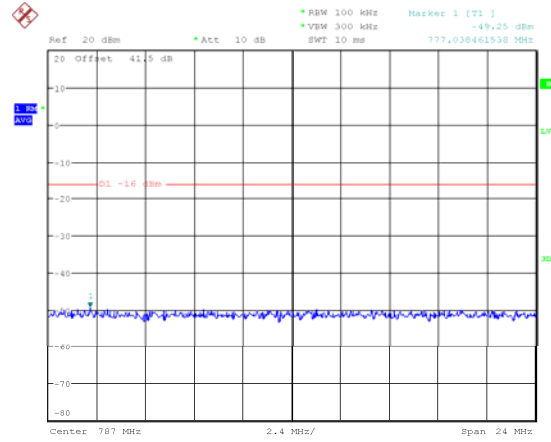


Date: 21.AUG.2020 19:40:40

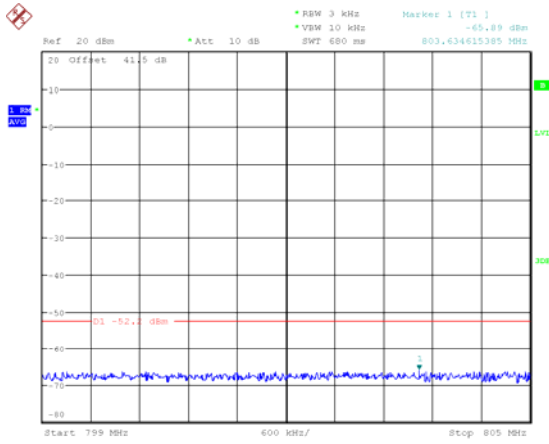
3M High Channel



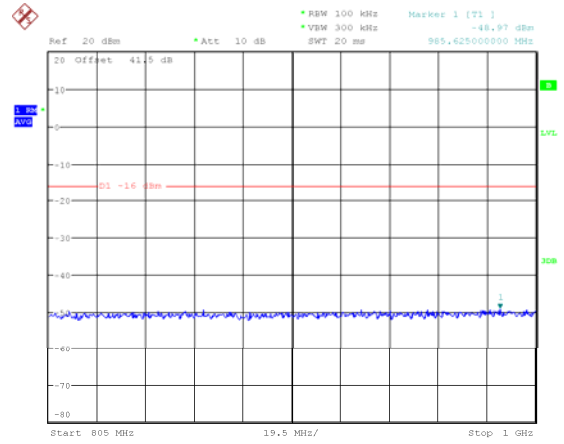
Date: 23.AUG.2020 11:16:35



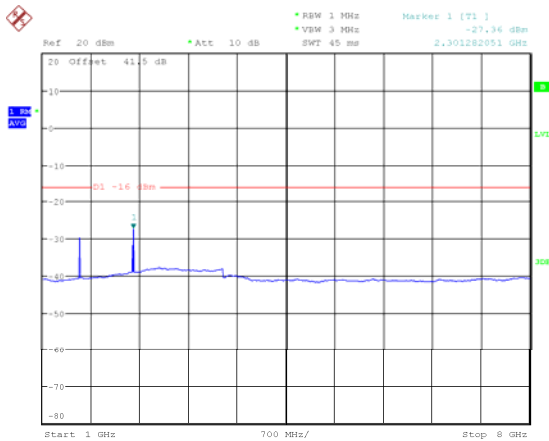
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Date: 23.AUG.2020 11:19:00

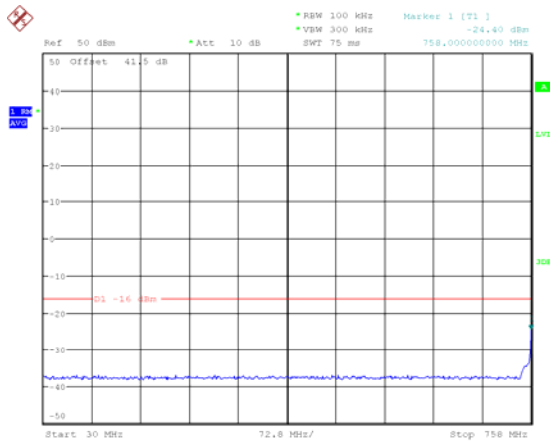


Date: 23.AUG.2020 11:19:34

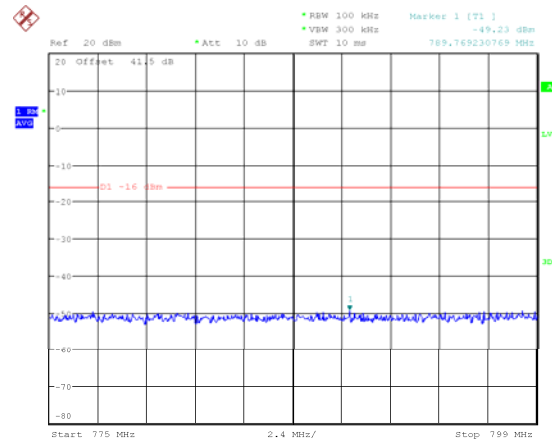


Date: 23.AUG.2020 11:15:19

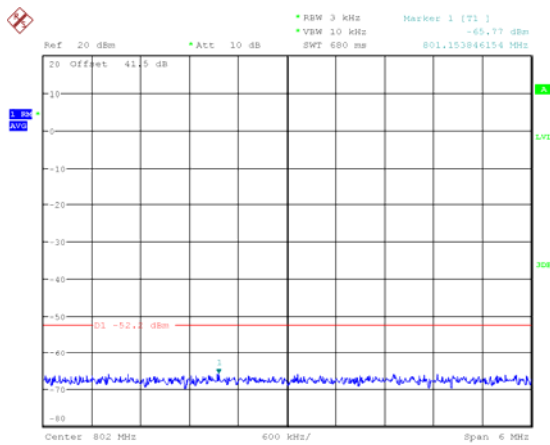
5M Low Channel



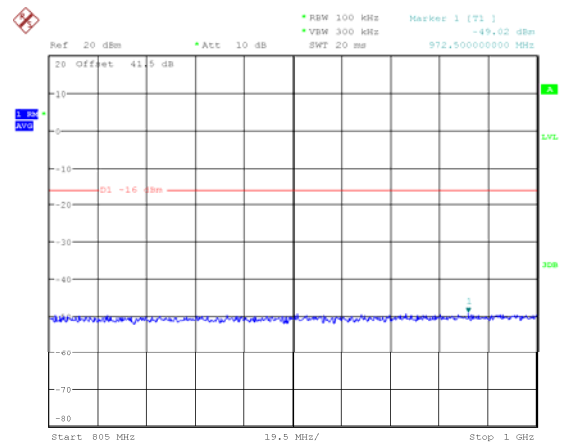
Date: 23.AUG.2020 13:46:53



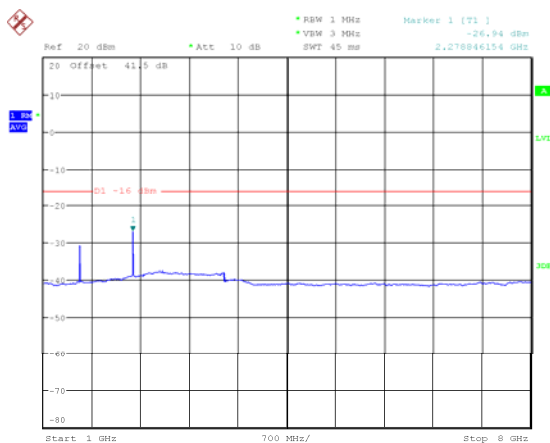
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Date: 23.AUG.2020 13:52:25

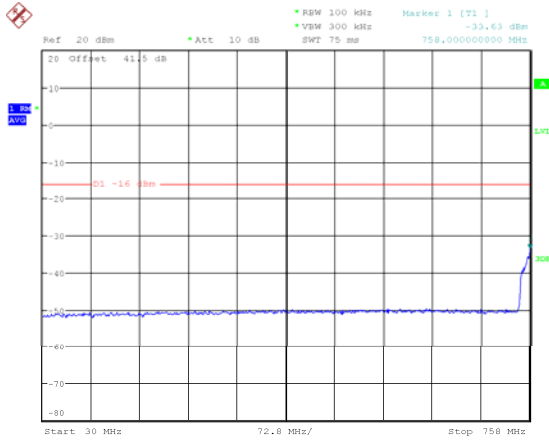


Date: 23.AUG.2020 13:53:15

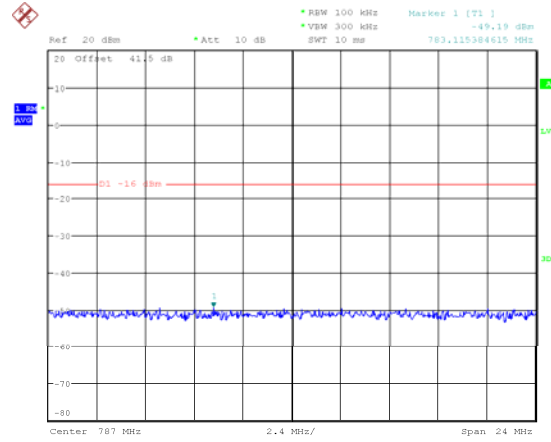


Date: 23.AUG.2020 13:53:58

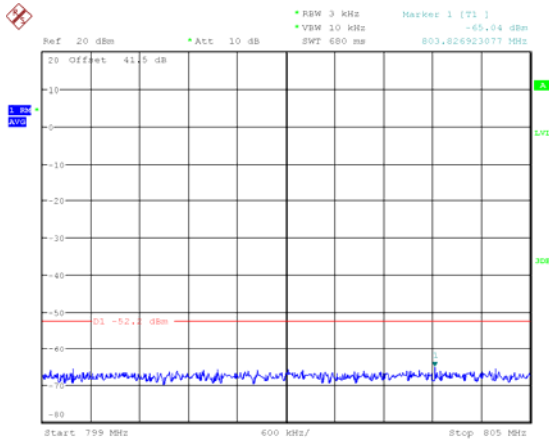
5M Middle Channel



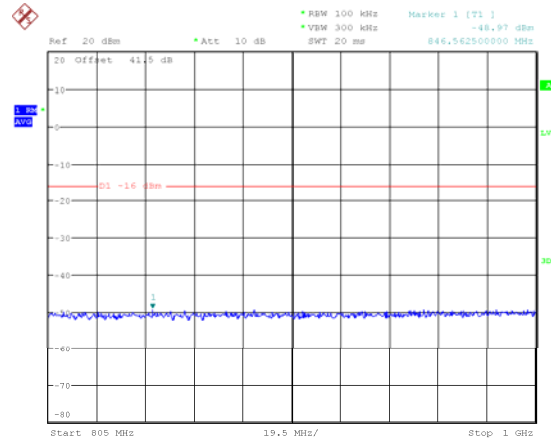
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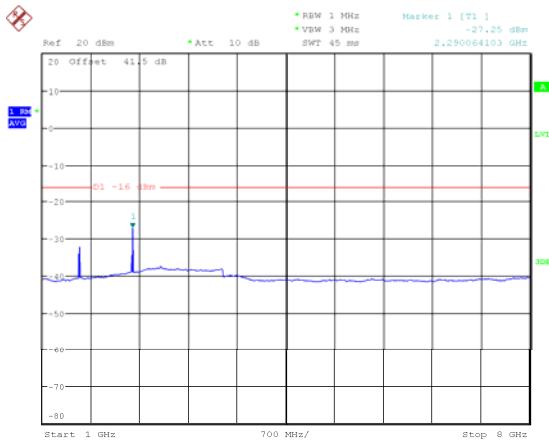
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Date: 23.AUG.2020 14:49:23

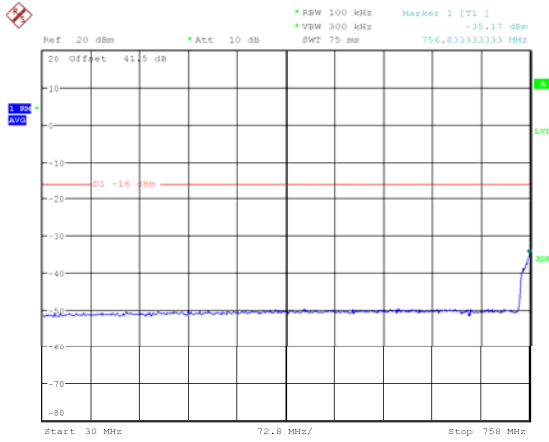


Date: 23.AUG.2020 14:50:23

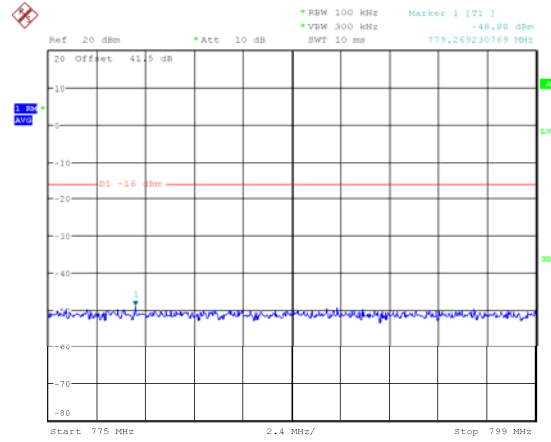


Date: 23.AUG.2020 14:51:42

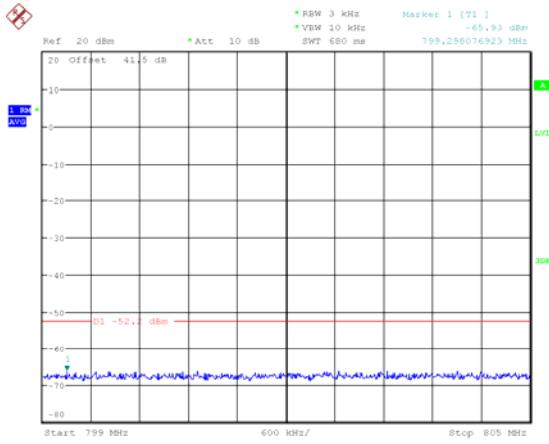
5M High Channel



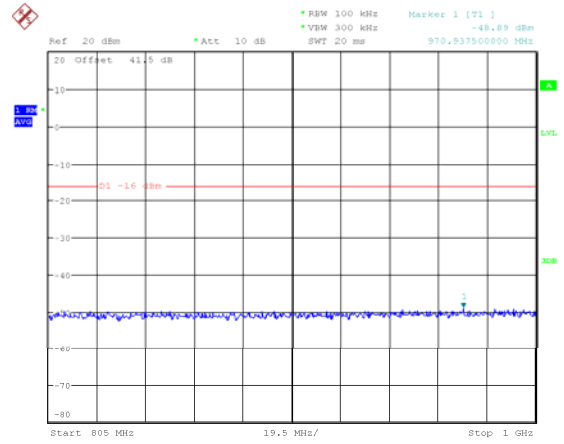
Date: 23.AUG.2020 15:41:32



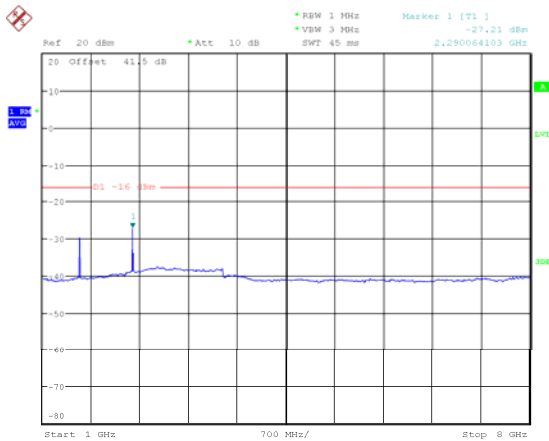
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Date: 23.AUG.2020 15:43:51

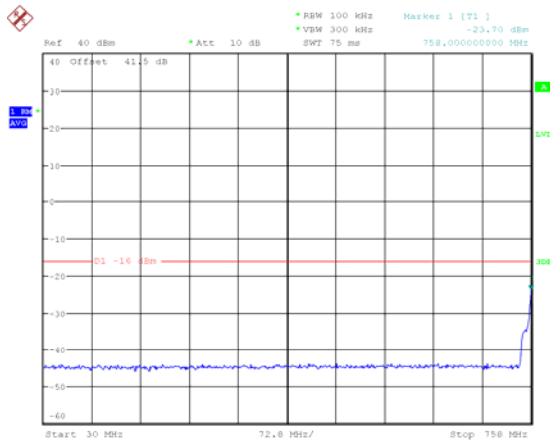


Date: 23.AUG.2020 15:44:17

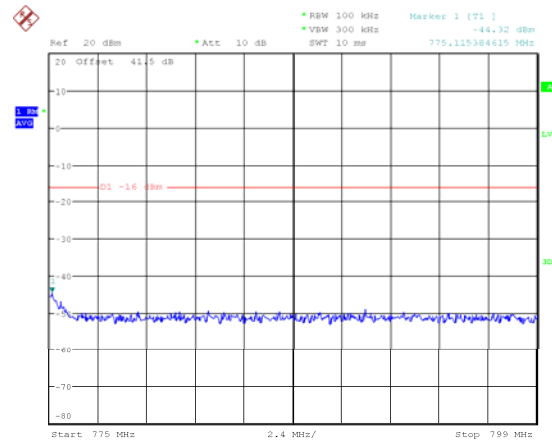


Date: 23.AUG.2020 15:45:02

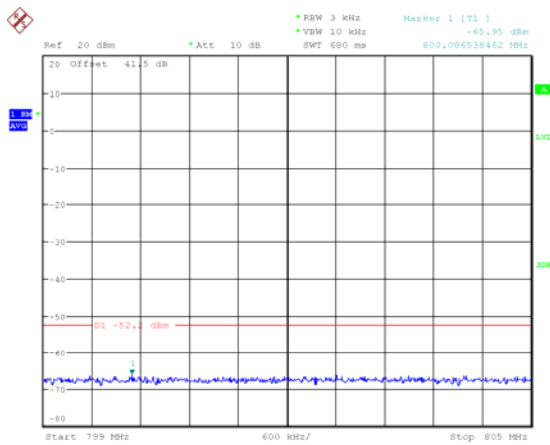
10M Middle Channel



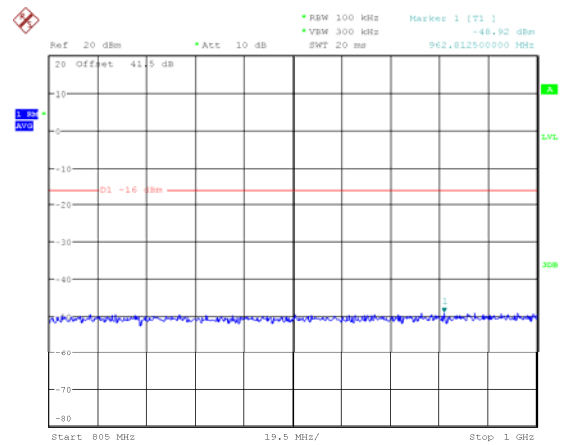
Date: 23.AUG.2020 16:48:00



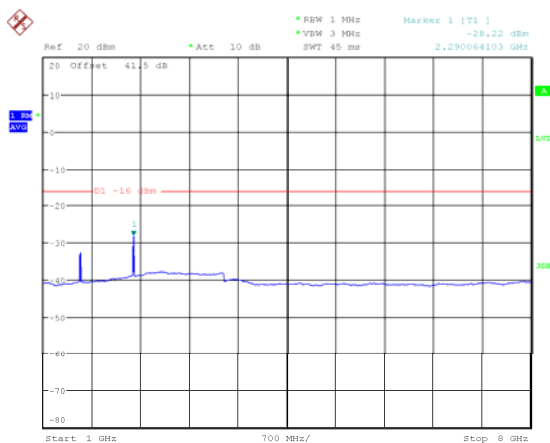
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Date: 23.AUG.2020 16:44:55

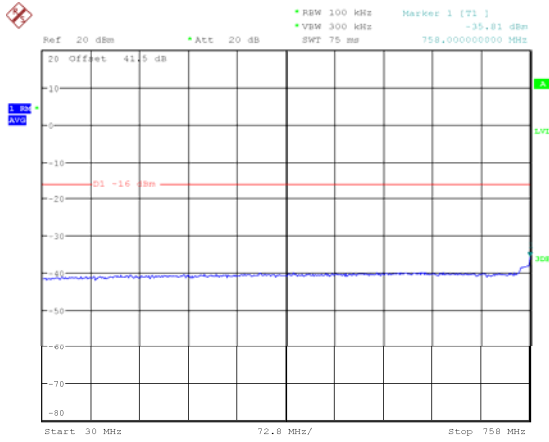


Date: 23.AUG.2020 16:45:18

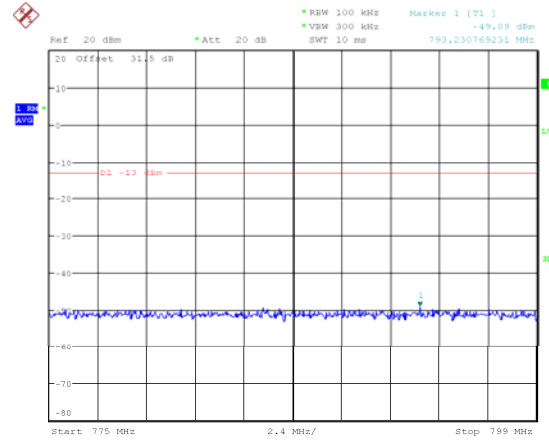


Date: 23.AUG.2020 16:46:54

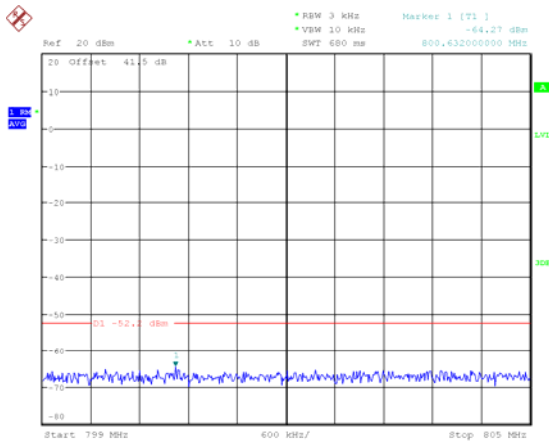
1.4M Middle Channel



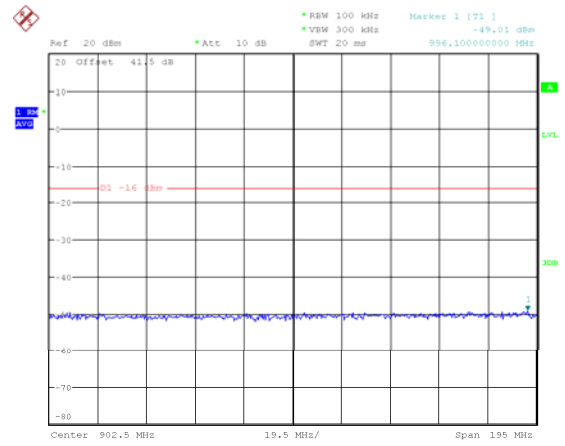
Date: 19.AUG.2020 20:30:24



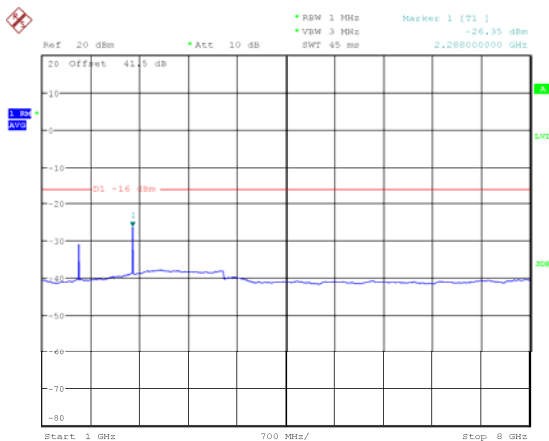
Date: 24.AUG.2020 21:36:41



Date: 19.AUG.2020 20:33:26

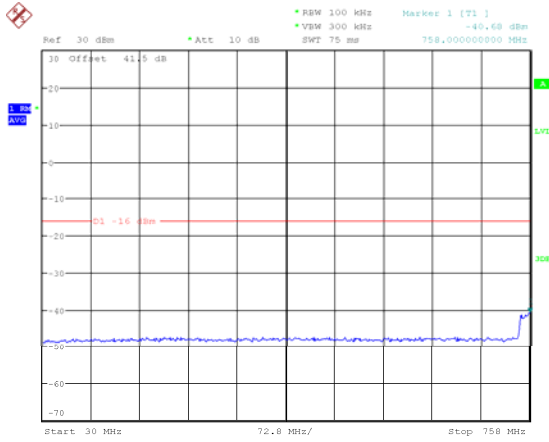


Date: 19.AUG.2020 20:34:08

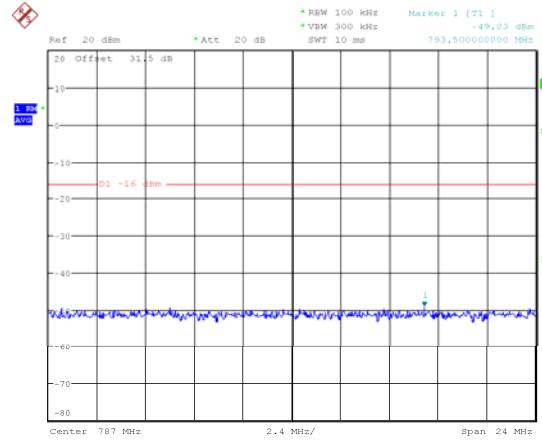


Date: 19.AUG.2020 20:34:55

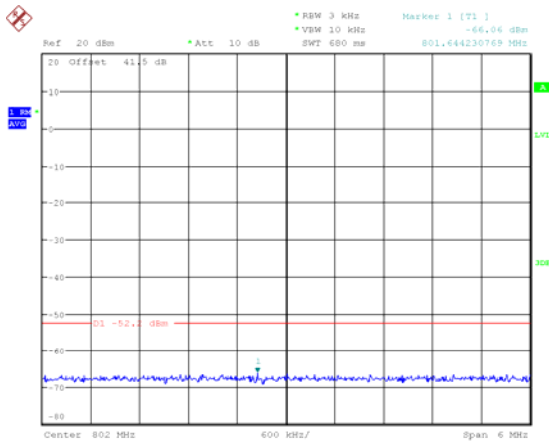
1.4M High Channel



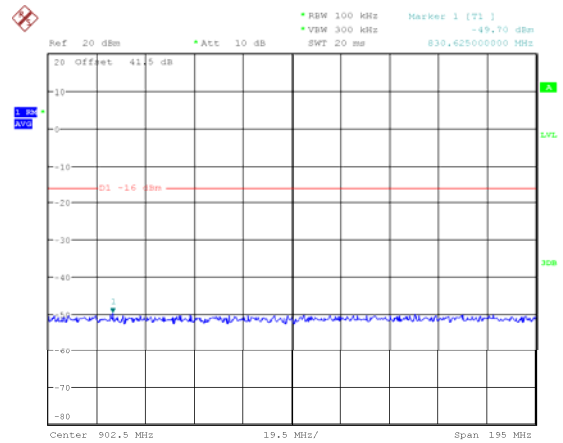
Date: 18.AUG.2020 20:32:57



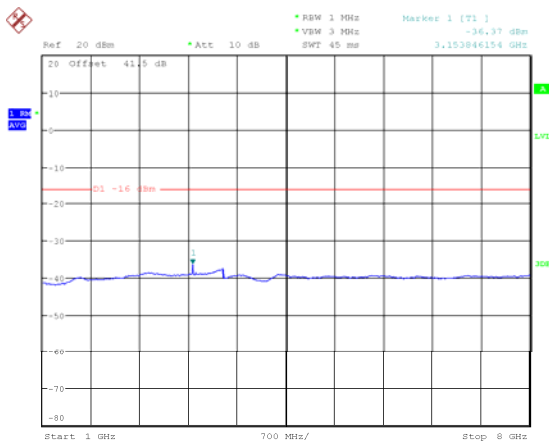
Date: 26.AUG.2020 10:34:11



Date: 18.AUG.2020 20:41:59

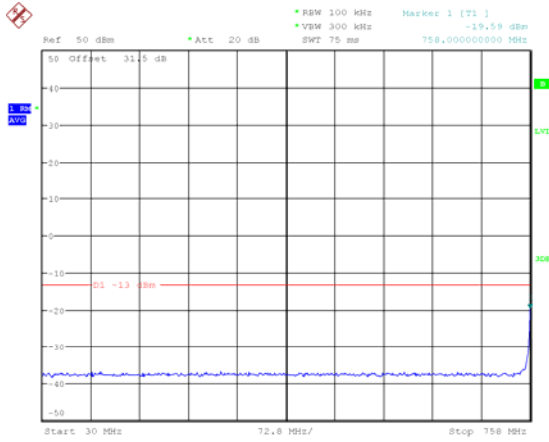


Date: 18.AUG.2020 20:39:54

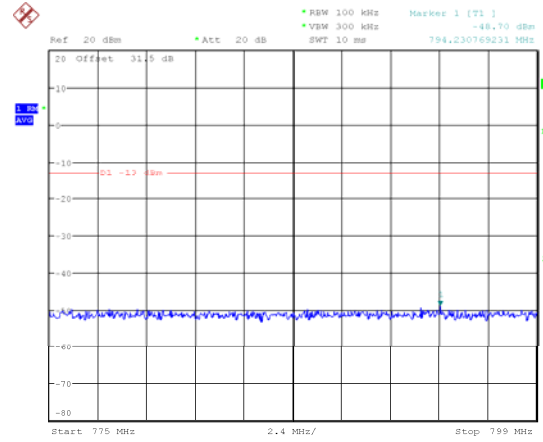


Date: 18.AUG.2020 20:36:11

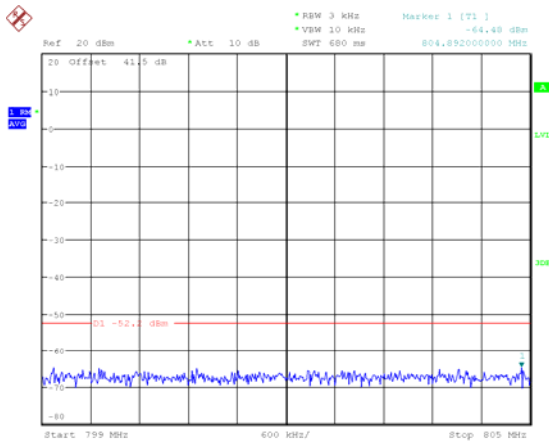
3M Low Channel



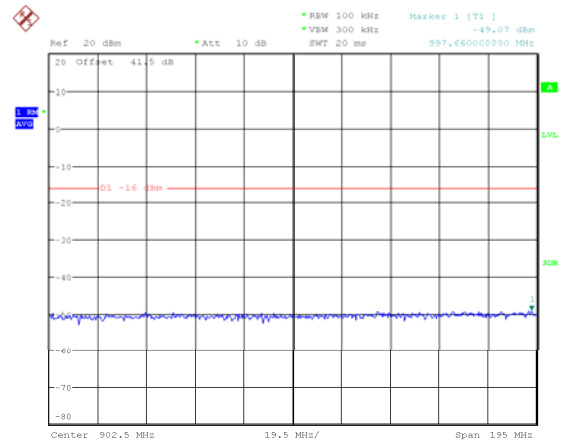
Date: 24.AUG.2020 21:45:25



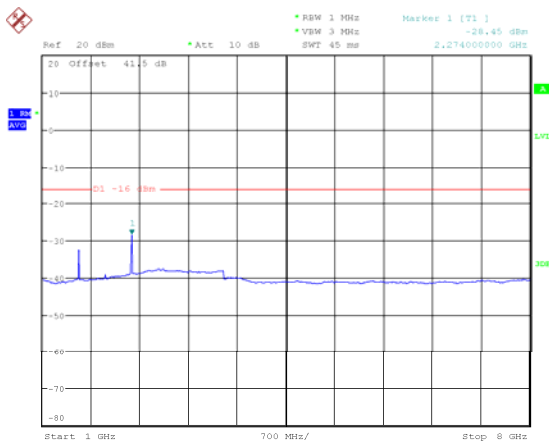
Date: 24.AUG.2020 21:42:59



Date: 19.AUG.2020 22:08:00



Date: 19.AUG.2020 22:08:41



Date: 19.AUG.2020 22:09:48

Ref 20 dBm Att 10 dB RBW 100 kHz VSM 300 kHz SWF 75 ms Marker 1 [T1] -34.85 dBm 758.000000000 MHz

Offset 4115 dB

D1 -16 dBm

Start 30 MHz 72.8 MHz/ Stop 758 MHz

Ref 20 dBm Att 10 dB SWT 10 ms 775.153846154 MHz

20 Offset 41.5 dB

10

0

-10

-20

-30

-40

-50

-60

-70

-80

Start 775 MHz 2.4 MHz/ Stop 799 MHz

Marker 1 [T1] -49.39 dBm

Offset 41.5 dB

Att 10 dB

SWT 10 ms

775.153846154 MHz

dBm

MHz

The screenshot shows a Spectrum Analyzer interface with the following parameters and data:

- Frequency Range:** Start 799 MHz, Stop 805 MHz, Center 800 kHz/.
- Power Range:** Ref 20 dBm, Attc 10 dB, Scale 10 kHz, Span 680 mHz.
- Marker 1:** 799.336538462 MHz, -65.25 dBm.
- Noise Floor:** D1 -52.2 dBm (indicated by a red horizontal line).
- Trace:** A blue trace showing the signal spectrum, which is mostly flat and noisy around the -52.2 dBm level.

Ref 20 dBm • Att 10 dB • BW 100 kHz Marker 1 [T1] -48.77 dBm
 • VMW 300 kHz SWT 20 ms 974.375000000 MHz

20 Offset 41.5 dB

10

0

-10

-20

-30

-40

-50

-60

-70

-80

Start 805 MHz 19.5 MHz/ Stop 1 GHz

Ref 20 dBm Att 10 dB RBW 1 MHz VMR 3 MHz SWT 45 ms Marker 1 [T1] -27.17 dBm

20 Offset 41.5 dB

10 dBm

0

-10

-20

-30

-40

-50

-60

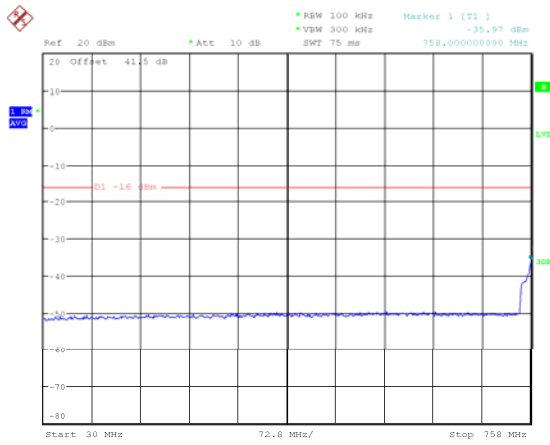
-70

-80

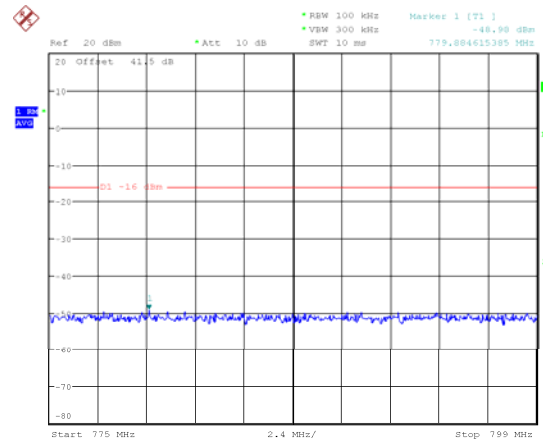
Start 1 GHz 700 MHz/ Stop 3 GHz

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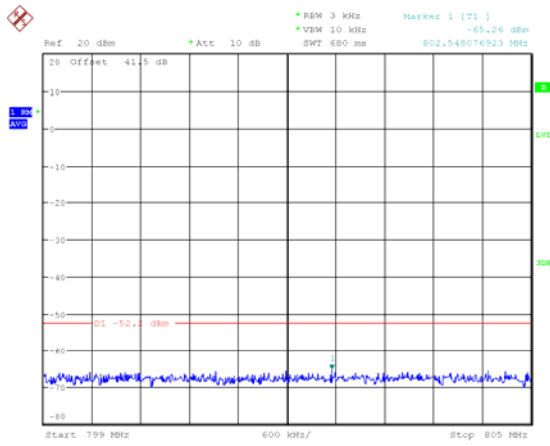
3M High Channel



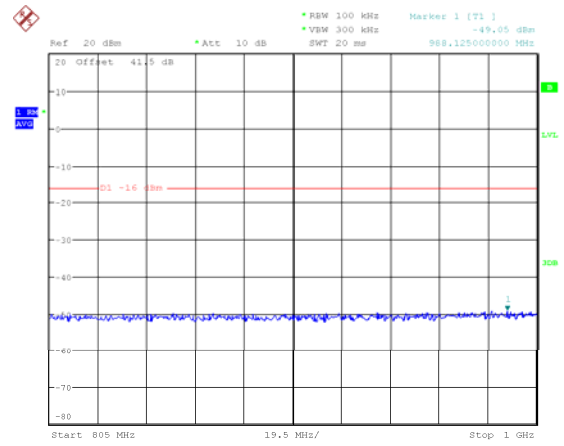
Date: 23.AUG.2020 11:22:04



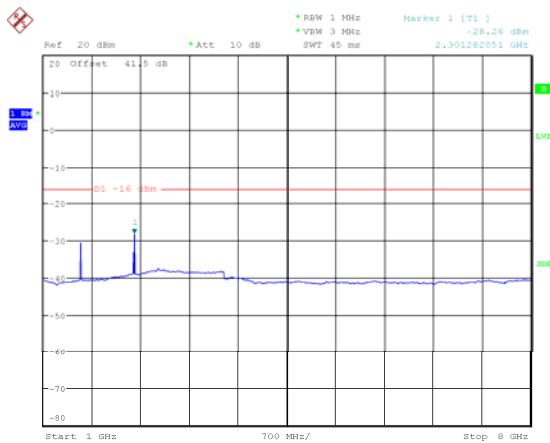
Date: 23.AUG.2020 11:23:28



Date: 23.AUG.2020 11:24:05

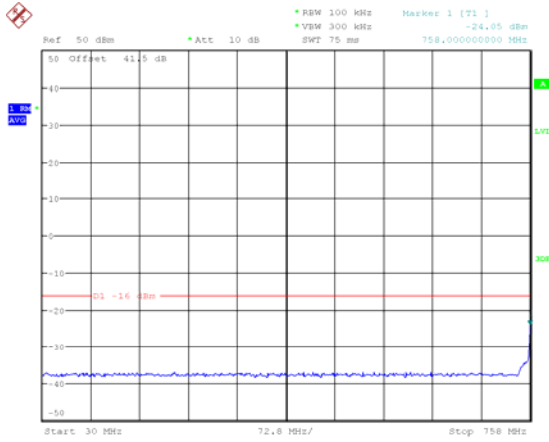


Date: 23.AUG.2020 11:20:31

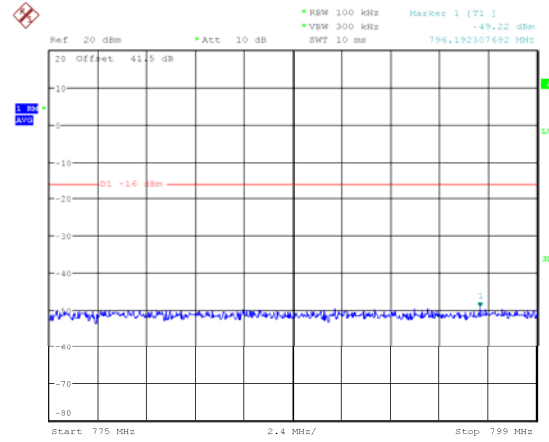


Date: 23.AUG.2020 11:20:50

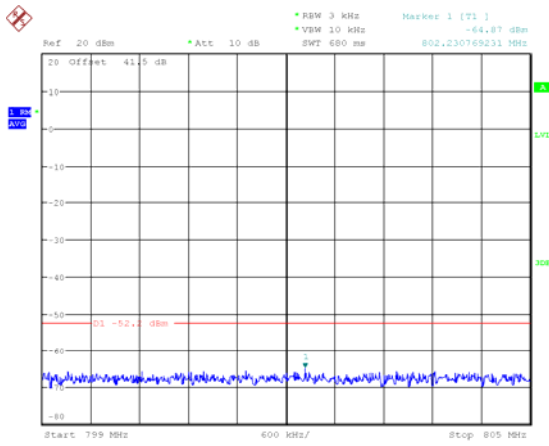
5M Low Channel



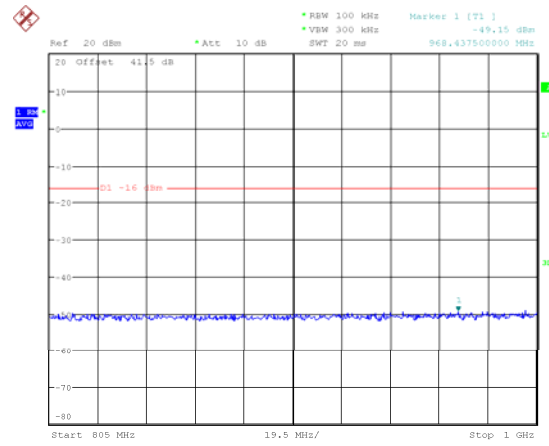
Date: 23.AUG.2020 13:46:18



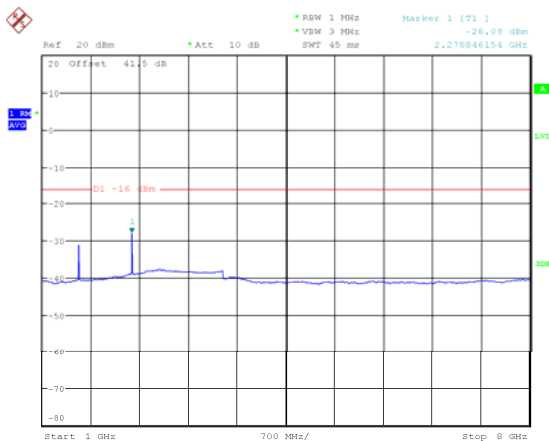
Date: 23.AUG.2020 13:51:41



Date: 23.AUG.2020 13:52:11

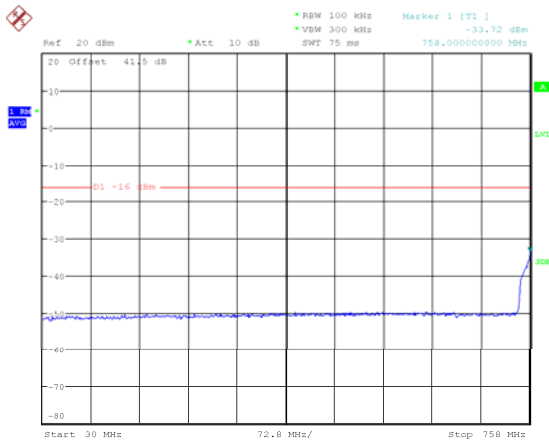


Date: 23.AUG.2020 13:53:30

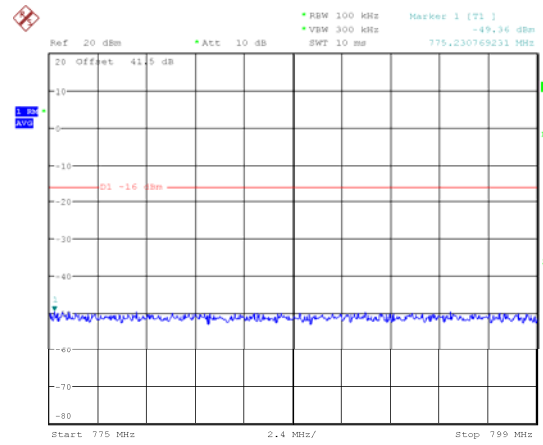


Date: 23.AUG.2020 13:54:43

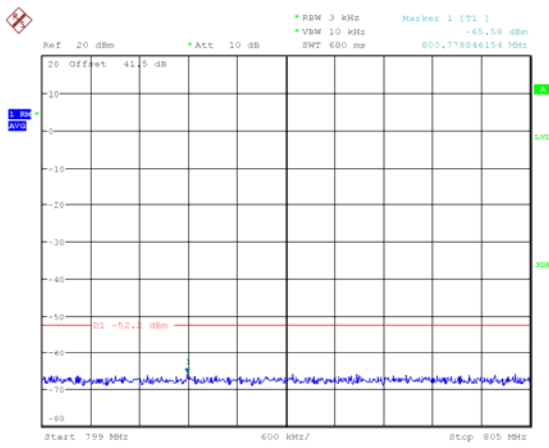
5M Middle Channel



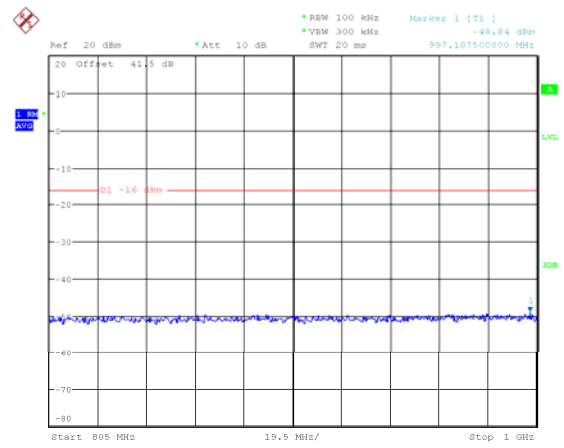
Date: 23.AUG.2020 14:47:14



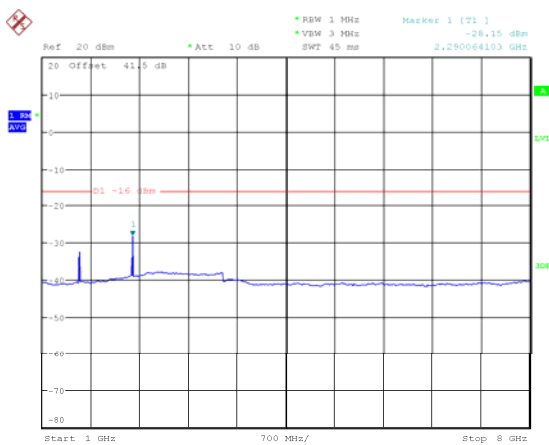
Date: 23.AUG.2020 14:48:23



Date: 23.AUG.2020 14:49:38

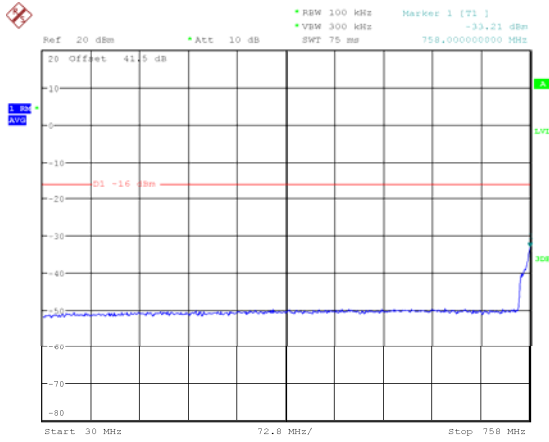


Date: 23.AUG.2020 14:50:09

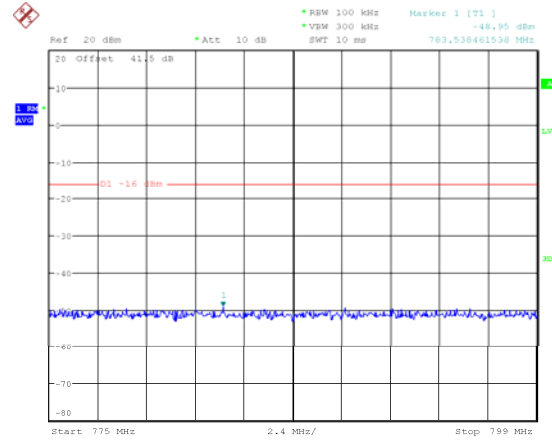


Date: 23.AUG.2020 14:51:00

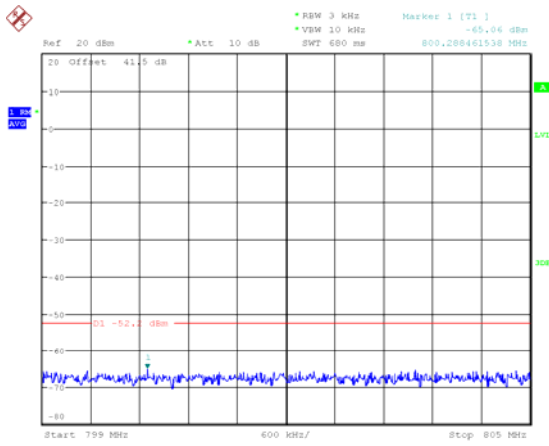
5M High Channel



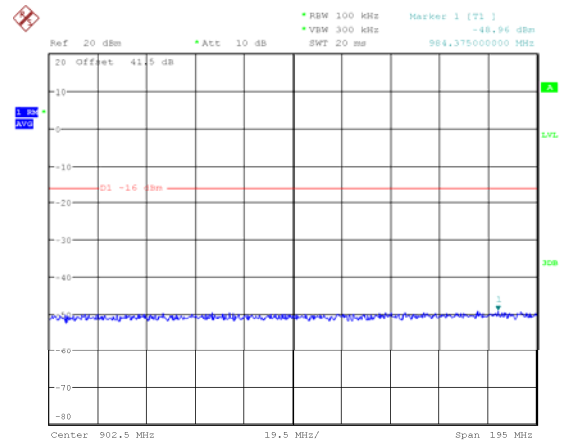
Date: 23.AUG.2020 15:46:52



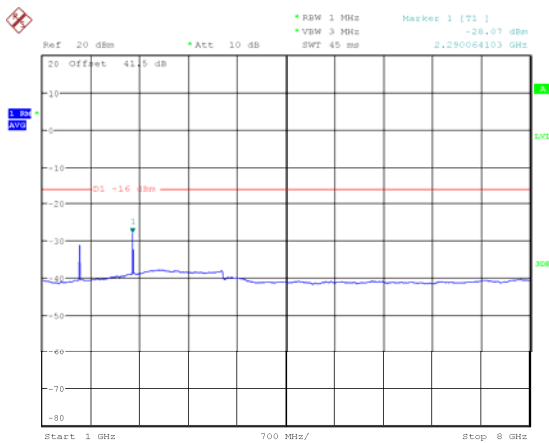
Date: 23.AUG.2020 15:42:56



Date: 23.AUG.2020 15:43:30

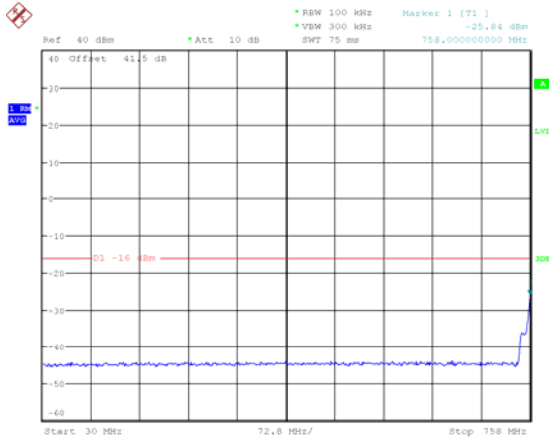


Date: 23.AUG.2020 15:44:35

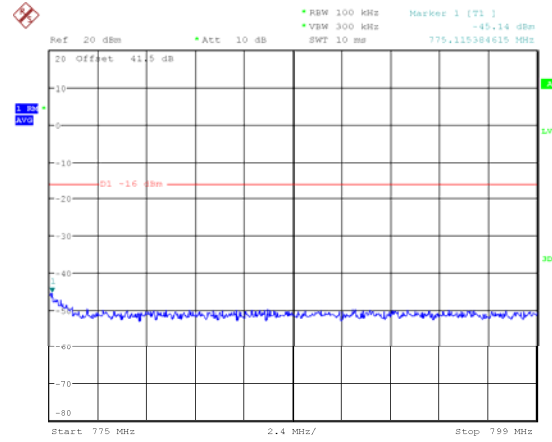


Date: 23.AUG.2020 15:45:42

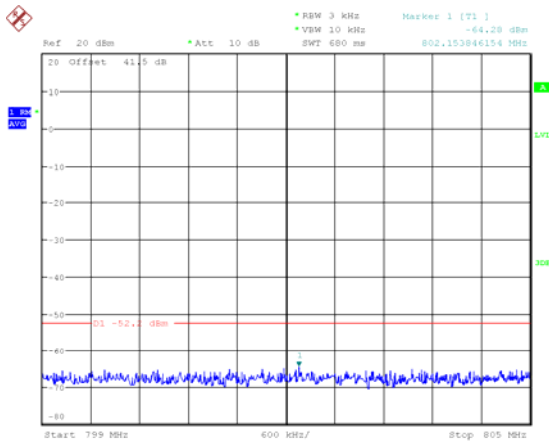
10M Middle Channel



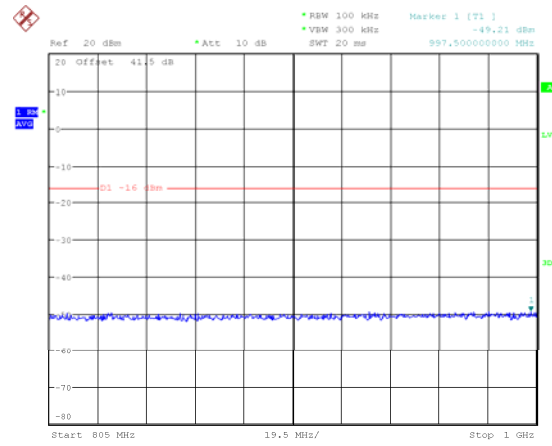
Date: 23.AUG.2020 16:42:13



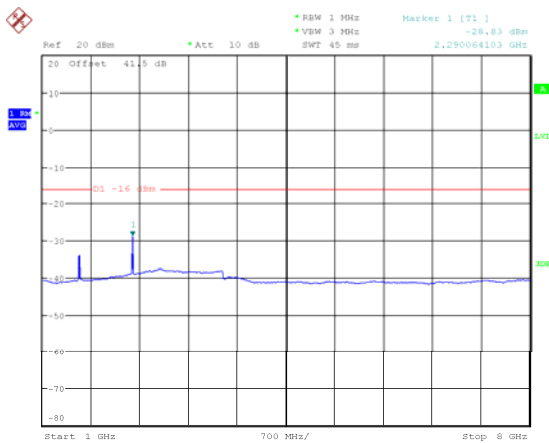
Date: 23.AUG.2020 16:44:01



Date: 23.AUG.2020 16:44:26



Date: 23.AUG.2020 16:45:45



Date: 23.AUG.2020 16:46:08

FCC §2.1051& §90.543- BAND EDGES

Applicable Standard

FCC §2.1051, and §90.543.

(e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2020-01-04	2021-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/04	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201048	Each time	N/A
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	Each time	N/A

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

Test Data**Environmental Conditions**

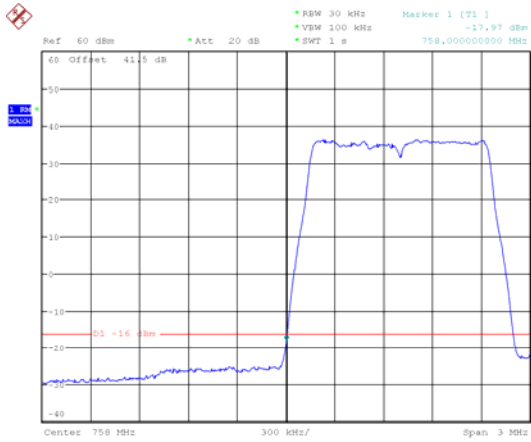
Temperature:	27.1~27.5 °C
Relative Humidity:	60~67%
ATM Pressure:	100.1~100.5kPa
Tester:	James Chen
Test Date:	2020-08-17~2020-08-27

Test mode: Transmitting

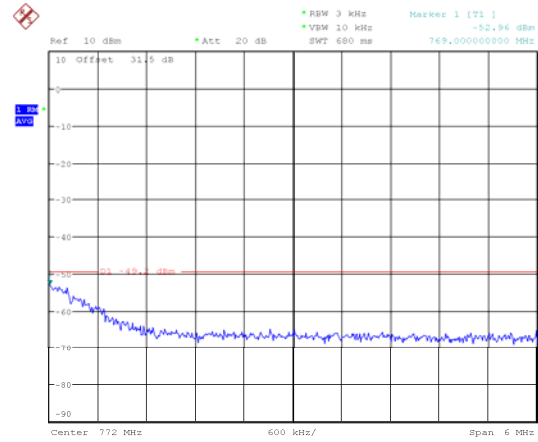
Test Result: Compliance.

Antenna 1:

1.4M QPSK

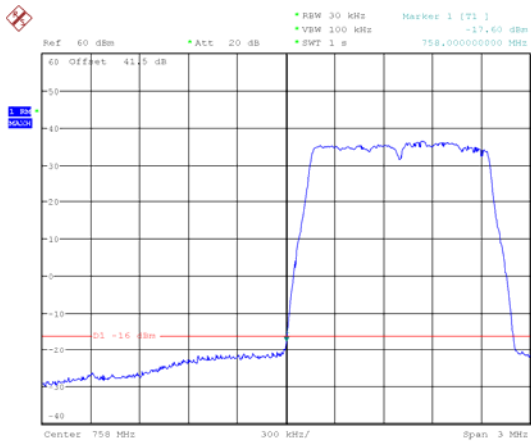


Date: 18.AUG.2020 21:24:15

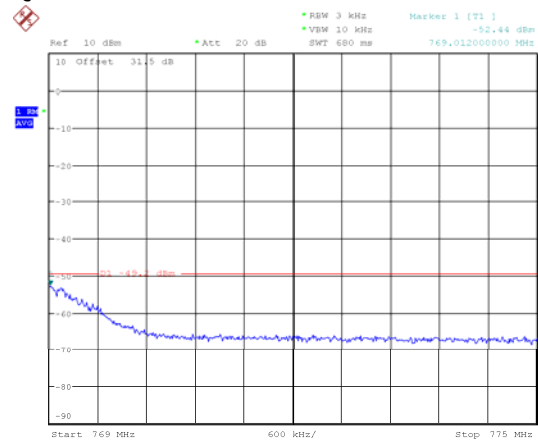


Date: 24.AUG.2020 21:10:39

1.4M 16QAM

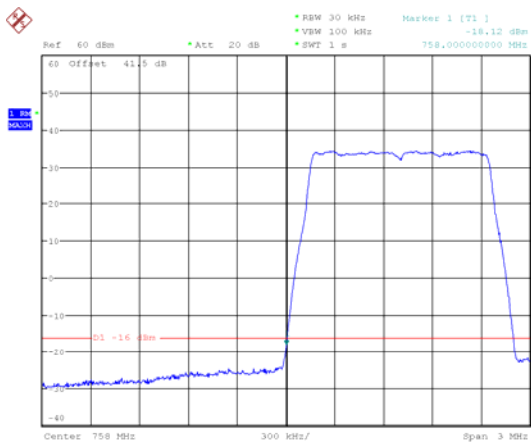


Date: 18.AUG.2020 21:47:52

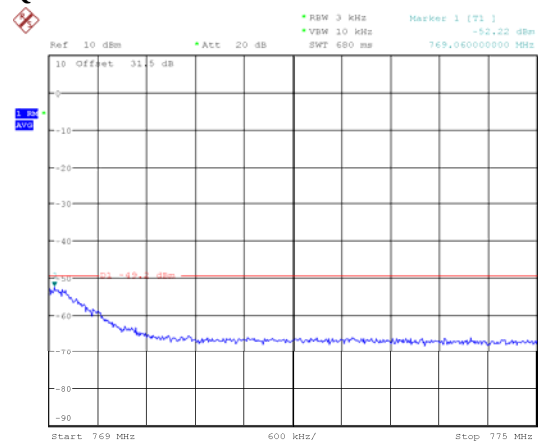


Date: 24.AUG.2020 21:13:38

1.4M 64QAM

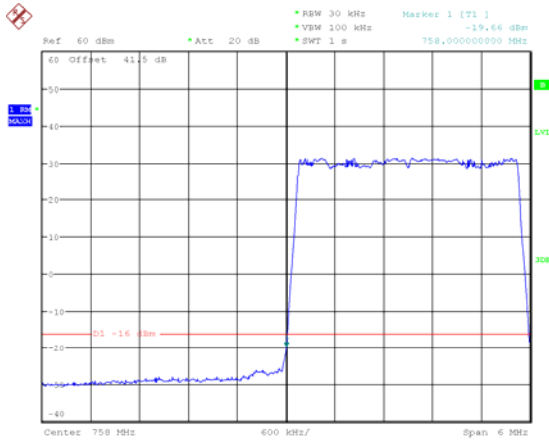


Date: 18.AUG.2020 22:42:25

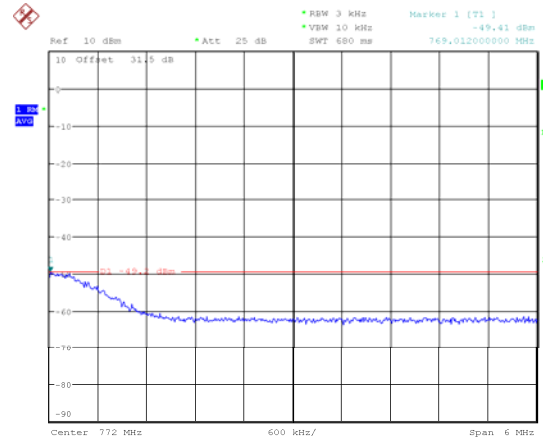


Date: 24.AUG.2020 21:15:35

3M QPSK

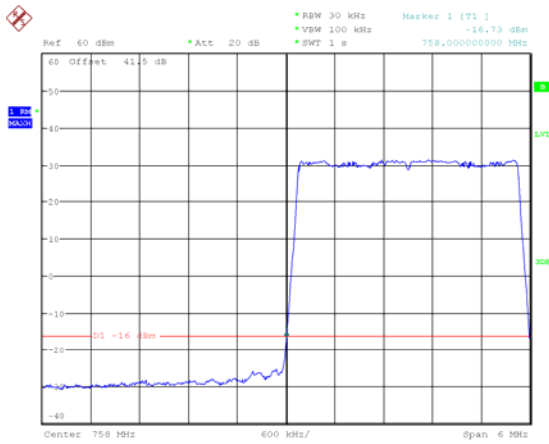


Date: 19.AUG.2020 21:45:48

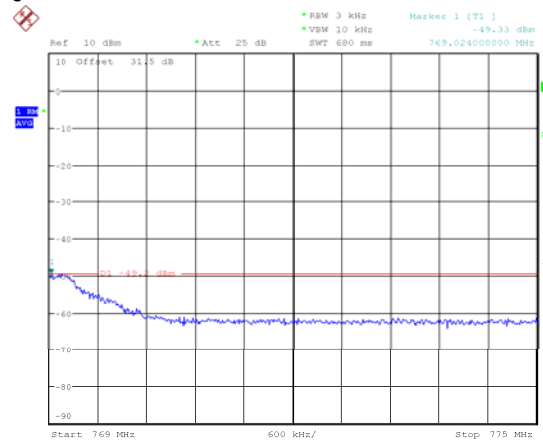


Date: 24.AUG.2020 22:27:47

3M 16QAM

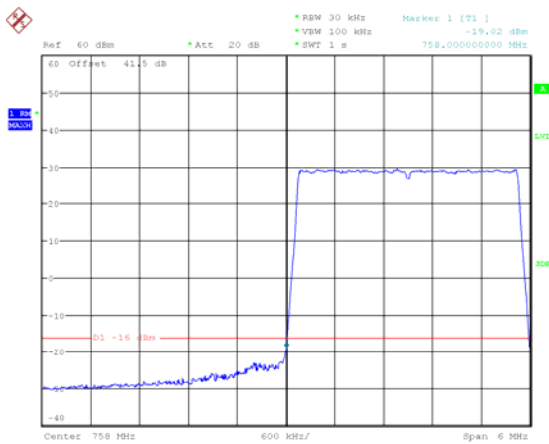


Date: 19.AUG.2020 22:33:39

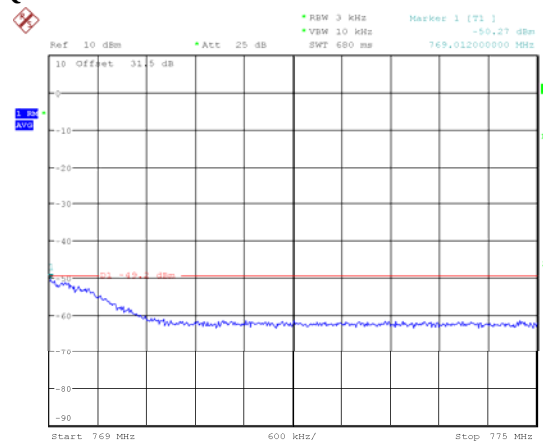


Date: 24.AUG.2020 22:30:27

3M 64QAM



Date: 21.AUG.2020 18:35:21



Date: 24.AUG.2020 22:33:15

Ref 60 dBm Att 20 dB RBW 100 kHz VSM 300 kHz SWT 1 s Marker 1 [T1] -16.99 dBm 758.000000000 MHz

60 Offset 41.5 dB

DB

D1 -16 dBm

Center 758 MHz 1 MHz/ Span 10 MHz

Ref 10 dBm Att 25 dB BW 3 kHz VM 10 kHz SWT 680 ms Marker 1 [T1] -50.31 dBm 769.01200000 MHz

10 Offset 31.5 dB

0

-10

-20

-30

-40

-50

-60

-70

-80

-90

Start 769 MHz 600 kHz/ Stop 775 MHz

Ref 10 dBm Att 25 dB BW 3 kHz VBW 10 kHz SWT 600 ms Marker 1 [T1] -49.73 dBm 769.012000000 MHz

10 Offset 31.5 dB

0 -10 -20 -30 -40 -50 -60 -70 -80 -90

Start 769 MHz 600 kHz/ Stop 775 MHz

21 -49.73 dBm

Ref 60 dBm Att 20 dB BW 100 kHz VM 300 kHz SW 1 m Marker 1 (T1) -17.31 dBm 758,000,000.000 MHz

DL -16 dBm

Center 758 MHz 1 MHz/div Span 10 MHz

Ref 10 dBm Att 25 dB SWT 680 ms Marker 1 [T1] -49.91 dBm 769.036000000 MHz

10 Offset 31.5 dB

10 dB

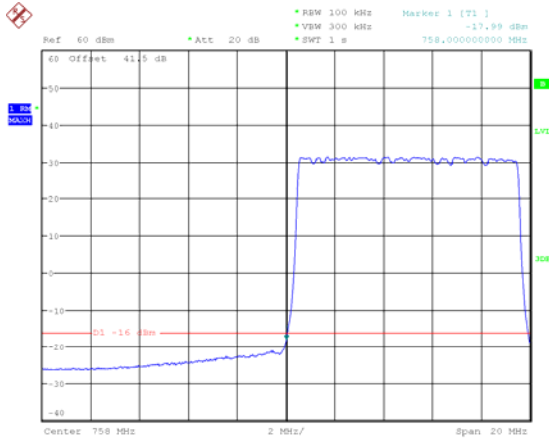
10

25 -49.91 dBm

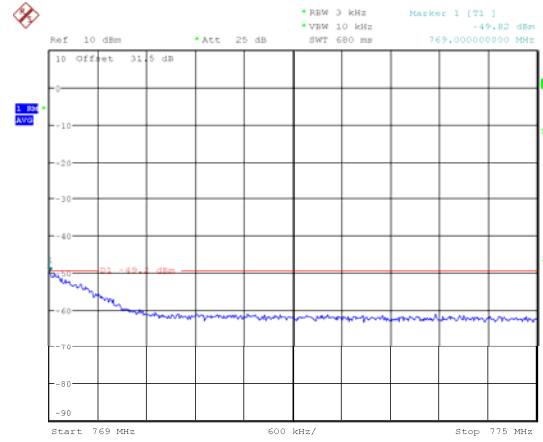
Center 772 MHz 600 kHz/ Span 6 MHz

Date: 24.AUG.2020 23:05:49

10M QPSK

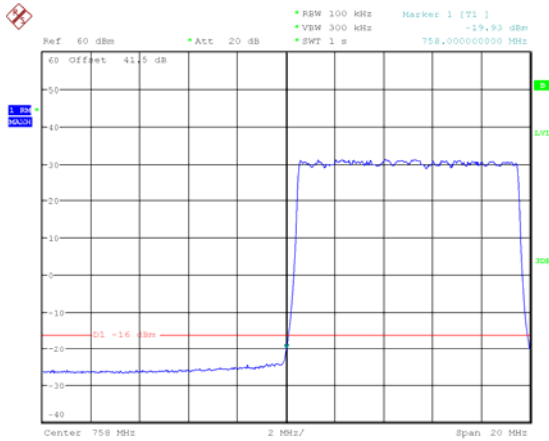


Date: 27.AUG.2020 20:32:18

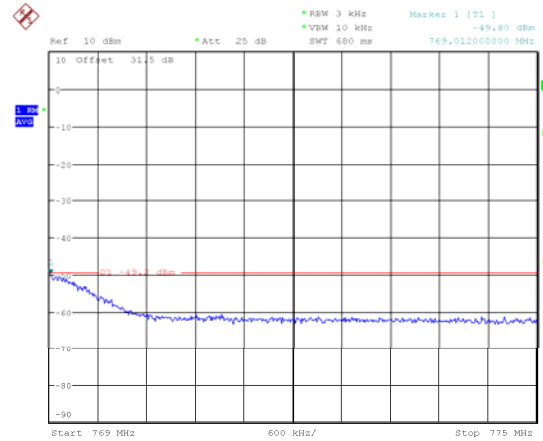


Date: 24.AUG.2020 23:14:01

10M 16QAM

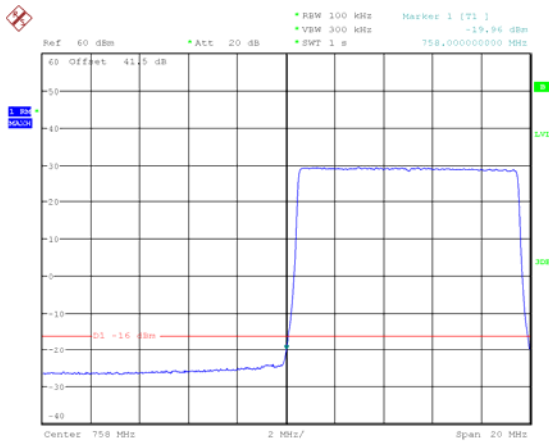


Date: 27.AUG.2020 20:35:34

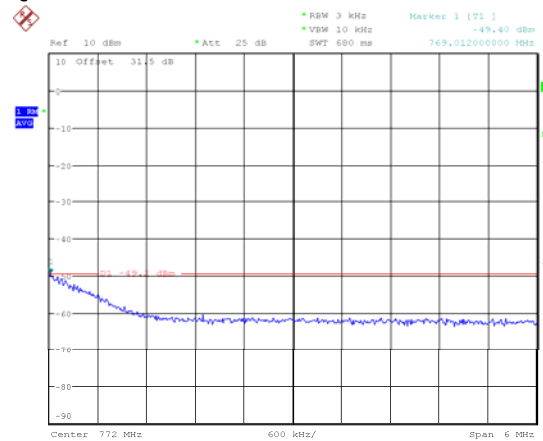


Date: 24.AUG.2020 23:15:47

10M 64QAM



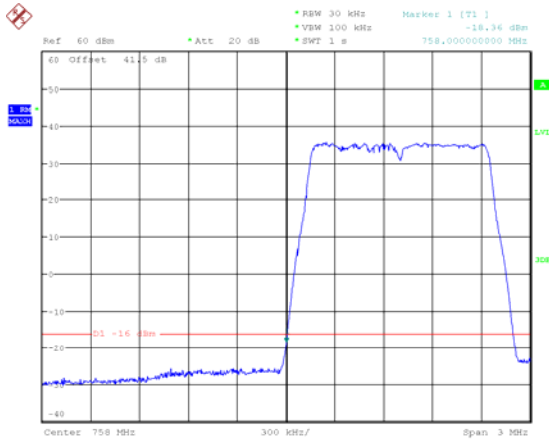
Date: 27.AUG.2020 20:38:05



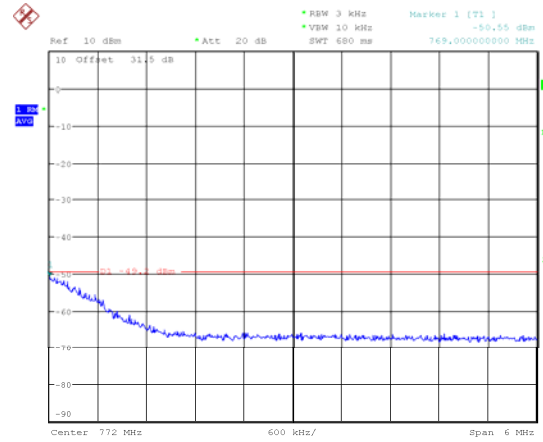
Date: 24.AUG.2020 23:17:58

Antenna 4:

1.4M QPSK

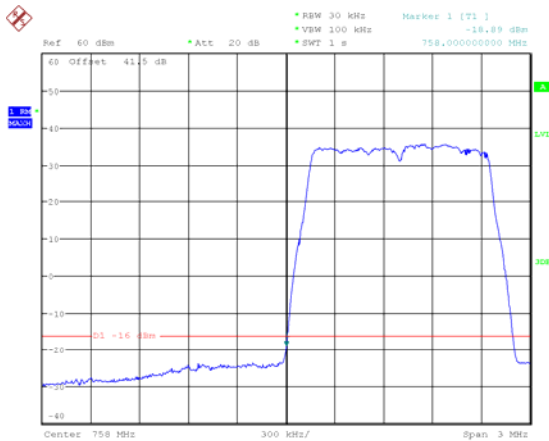


Date: 18.AUG.2020 20:58:21

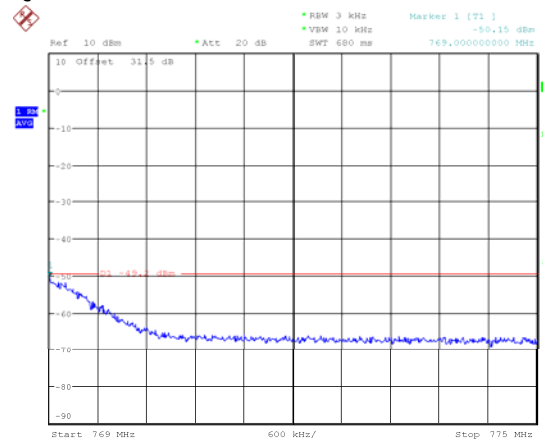


Date: 26.AUG.2020 18:33:54

1.4M 16QAM

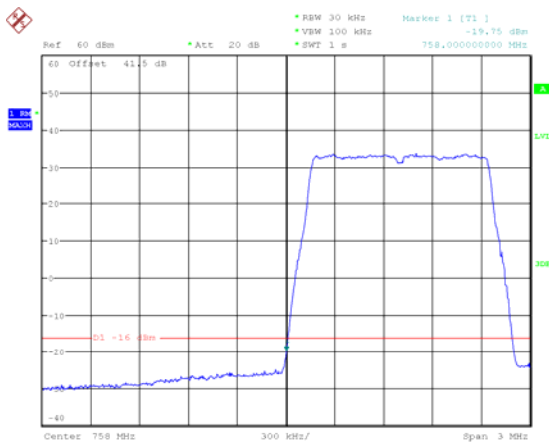


Date: 18.AUG.2020 21:45:24

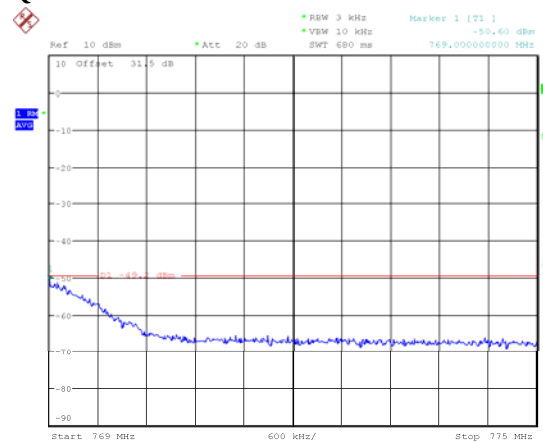


Date: 26.AUG.2020 18:28:20

1.4M 64QAM

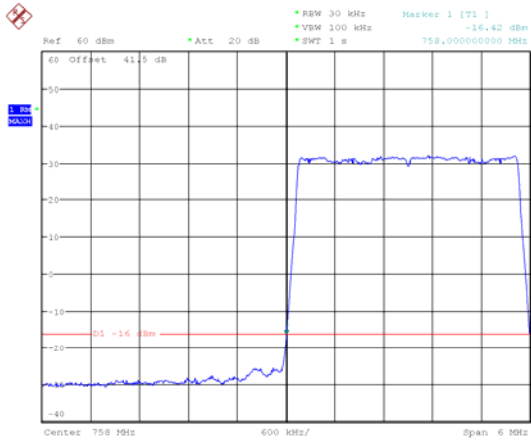


Date: 18.AUG.2020 22:39:46

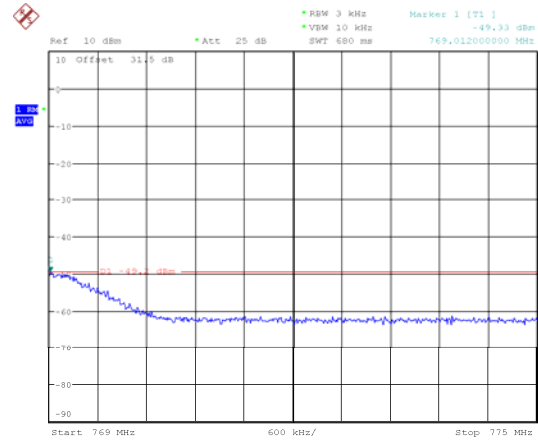


Date: 26.AUG.2020 18:35:05

3M QPSK

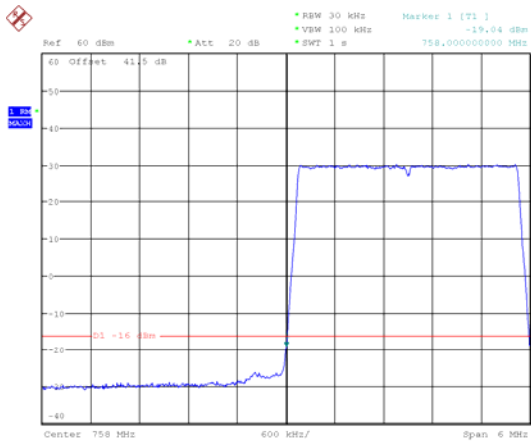


Date: 19.AUG.2020 22:32:42

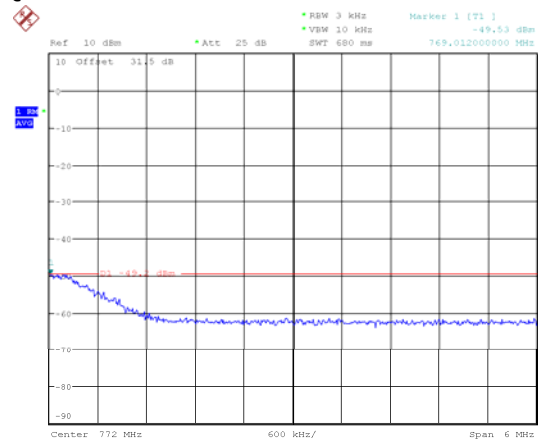


Date: 24.AUG.2020 22:25:25

3M 16QAM

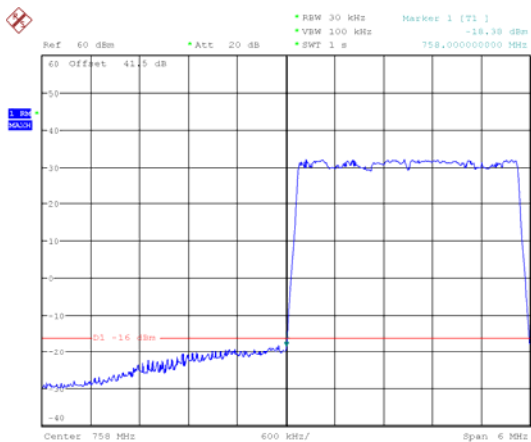


Date: 21.AUG.2020 18:04:10

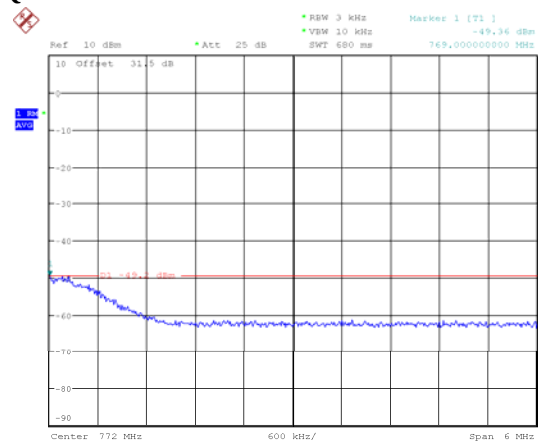


Date: 24.AUG.2020 22:28:46

3M 64QAM

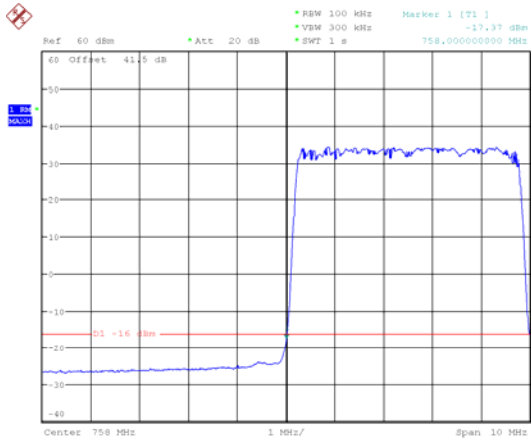


Date: 19.AUG.2020 21:44:58

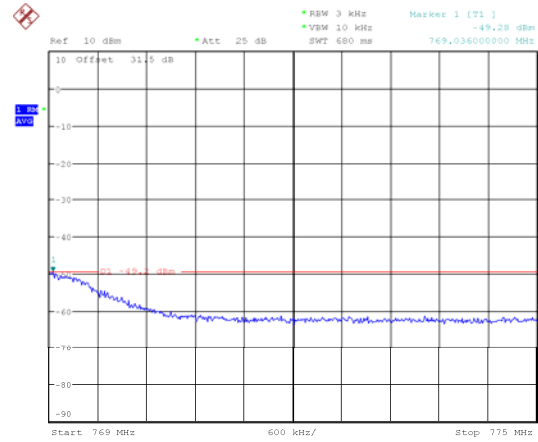


Date: 24.AUG.2020 22:31:06

5M QPSK

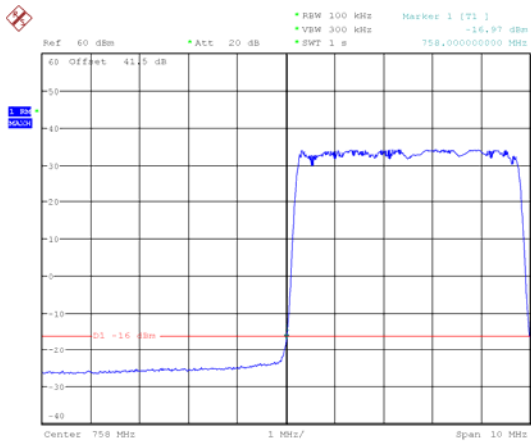


Date: 23.AUG.2020 12:15:35

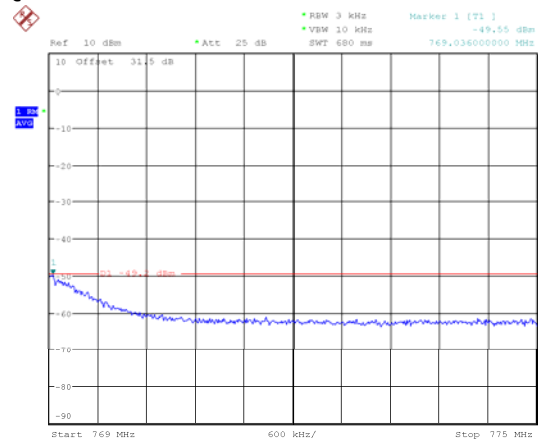


Date: 24.AUG.2020 22:59:20

5M 16QAM

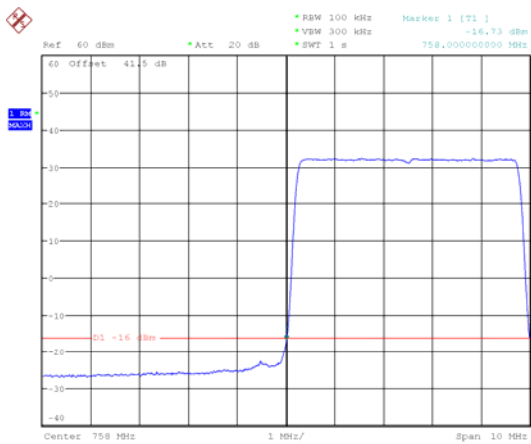


Date: 23.AUG.2020 13:57:07

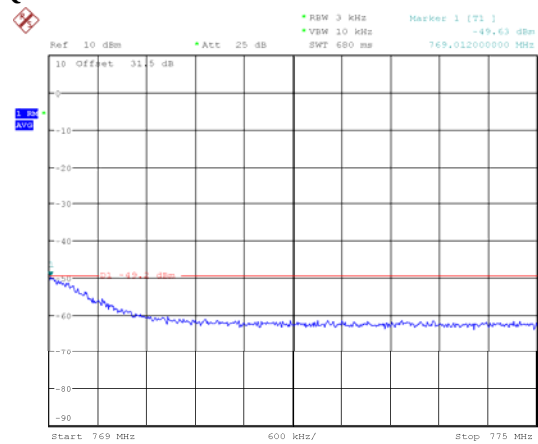


Date: 24.AUG.2020 23:02:55

5M 64QAM

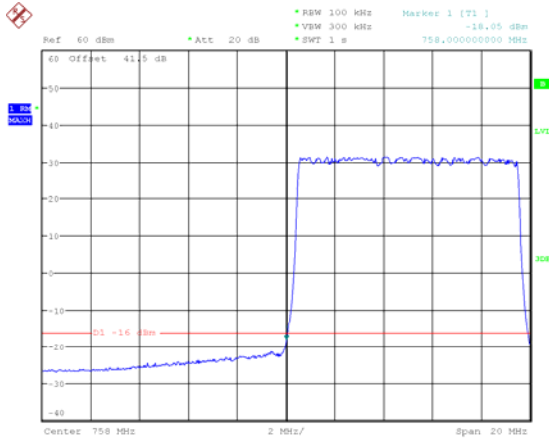


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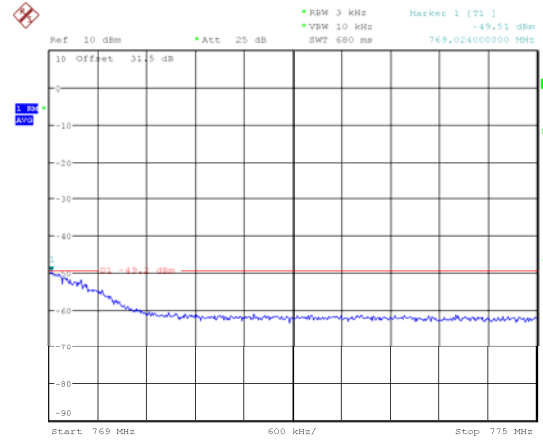


Date: 24.AUG.2020 23:05:23

10M QPSK

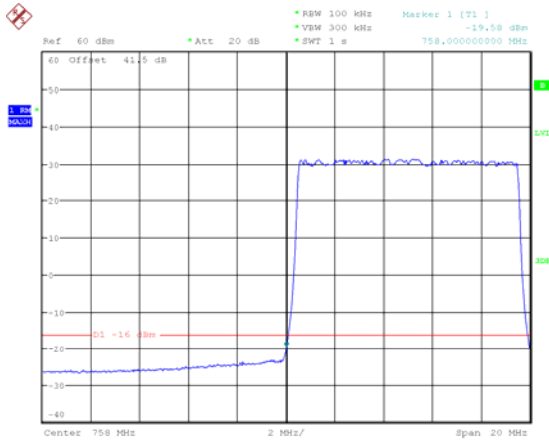


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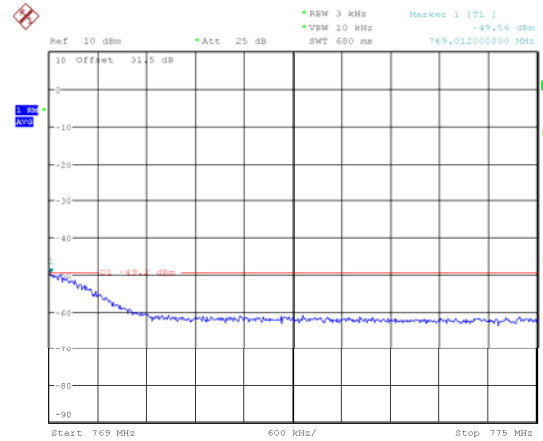


Date: 24.AUG.2020 23:13:27

10M 16QAM

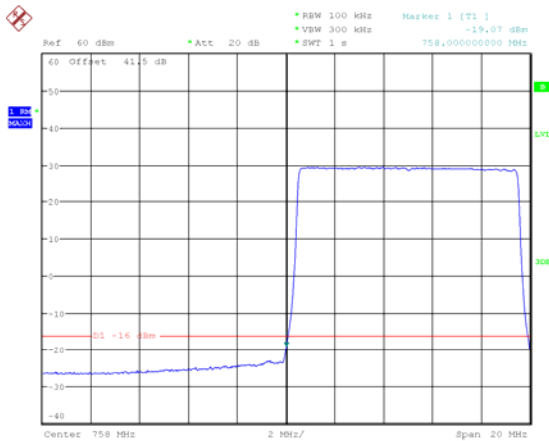


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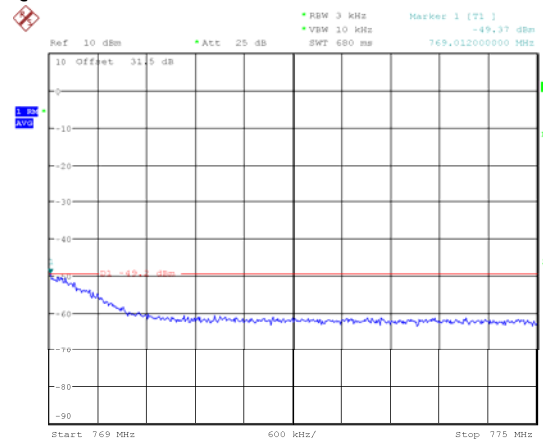


Date: 24.AUG.2020 23:15:16

10M 64QAM



Date: 27.AUG.2020 20:37:01



Date: 24.AUG.2020 23:17:29

FCC §2.1053& §90.543- SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC §2.1051, and §90.543.

(e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

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 tenth 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 = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10} (\text{power out in Watts})$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
R&S	EMI Test Receiver	ESR3	102453	2019-09-12	2020-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2020-05-06	2021-05-06
HP	Amplifier	8447D	2727A05902	2019-09-05	2020-09-05
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
Agilent	Signal Generator	E8247C	MY43321350	2019-12-10	2020-12-10
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-07-07	2021-07-07
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2019-09-05	2020-09-05

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

Test Data**Environmental Conditions**

Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	25.5°C	25.6°C
Relative Humidity:	53%	56%
ATM Pressure:	100.1kPa	100.1kPa
Tester:	Joker Chen	Bond Qin
Test Date:	2020-08-20	2020-08-20

Test mode: Transmitting

Test Result: Compliance. QPSK 1.4M mode was the worst, please refer to the below tables:

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)			
Low Channel: 758.7 MHz								
1517.40	H	35.42	-69.12	10.05	1.34	-60.41	-13.00	47.41
1517.40	V	35.14	-69.33	10.05	1.34	-60.62	-13.00	47.62
2276.10	H	48.14	-55.21	11.89	1.19	-44.51	-13.00	31.51
2276.10	V	51.79	-52.32	11.89	1.19	-41.62	-13.00	28.62
3034.80	H	38.00	-63.77	12.39	1.51	-52.89	-13.00	39.89
3034.80	V	38.10	-63.47	12.39	1.51	-52.59	-13.00	39.59
3793.50	H	34.94	-65.18	12.26	1.52	-54.44	-13.00	41.44
3793.50	V	34.58	-65.40	12.26	1.52	-54.66	-13.00	41.66
4552.20	H	34.85	-63.05	13.36	1.53	-51.22	-13.00	38.22
4552.20	V	35.14	-63.05	13.36	1.53	-51.22	-13.00	38.22
5310.90	H	36.14	-59.74	12.88	1.32	-48.18	-13.00	35.18
5310.90	V	36.24	-59.79	12.88	1.32	-48.23	-13.00	35.23
499.60	H	49.17	-55.06	0.00	0.71	-55.77	-13.00	42.77
499.60	V	53.39	-53.87	0.00	0.71	-54.58	-13.00	41.58
Middle Channel: 763 MHz								
1526.00	H	35.43	-69.10	10.08	1.34	-60.36	-13.00	47.36
1526.00	V	35.12	-69.34	10.08	1.34	-60.60	-13.00	47.60
2289.00	H	48.21	-55.11	11.90	1.19	-44.40	-13.00	31.40
2289.00	V	49.47	-54.64	11.90	1.19	-43.93	-13.00	30.93
3052.00	H	37.97	-63.77	12.38	1.51	-52.90	-13.00	39.90
3052.00	V	38.17	-63.32	12.38	1.51	-52.45	-13.00	39.45
3815.00	H	34.80	-65.26	12.26	1.51	-54.51	-13.00	41.51
3815.00	V	34.68	-65.34	12.26	1.51	-54.59	-13.00	41.59
4578.00	H	34.96	-62.85	13.34	1.52	-51.03	-13.00	38.03
4578.00	V	35.00	-63.06	13.34	1.52	-51.24	-13.00	38.24
5341.00	H	36.11	-59.72	12.86	1.30	-48.16	-13.00	35.16
5341.00	V	36.26	-59.77	12.86	1.30	-48.21	-13.00	35.21
499.60	H	49.76	-54.47	0.00	0.71	-55.18	-13.00	42.18
499.60	V	53.42	-53.84	0.00	0.71	-54.55	-13.00	41.55

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)			
High Channel: 767.3 MHz								
1534.60	H	35.44	-69.08	10.10	1.33	-60.31	-13.00	47.31
1534.60	V	35.17	-69.28	10.10	1.33	-60.51	-13.00	47.51
2301.90	H	49.41	-53.88	11.92	1.20	-43.16	-13.00	30.16
2301.90	V	51.89	-52.23	11.92	1.20	-41.51	-13.00	28.51
3069.20	H	37.99	-63.72	12.37	1.52	-52.87	-13.00	39.87
3069.20	V	38.14	-63.27	12.37	1.52	-52.42	-13.00	39.42
3836.50	H	34.81	-65.19	12.27	1.50	-54.42	-13.00	41.42
3836.50	V	34.62	-65.44	12.27	1.50	-54.67	-13.00	41.67
4603.80	H	34.75	-62.98	13.32	1.52	-51.18	-13.00	38.18
4603.80	V	35.05	-62.89	13.32	1.52	-51.09	-13.00	38.09
499.60	H	50.75	-53.48	0.00	0.71	-54.19	-13.00	41.19
499.60	V	53.47	-53.79	0.00	0.71	-54.50	-13.00	41.50

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

FCC §2.1055, §90.539 - FREQUENCY STABILITY

Applicable Standard

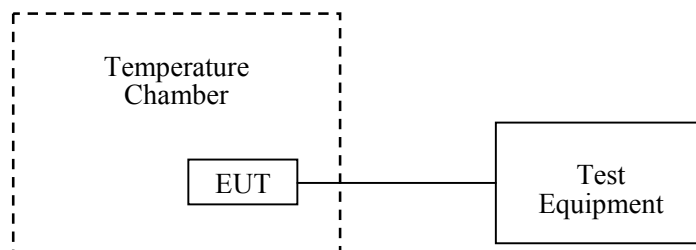
FCC § 2.1055 (a), § 2.1055 (d), §90.539

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set 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 communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set from 85% to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2020-01-09	2021-01-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/04	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201048	Each time	N/A
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	Each time	N/A
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2020-03-10	2021-03-09
UNI-T	Multimeter	UT39A	M130199938	2019-07-24	2020-07-24
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

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

Test Data**Environmental Conditions**

Temperature:	27.1~27.4 °C
Relative Humidity:	61 ~67%
ATM Pressure:	100.1~100.5kPa
Tester:	James Chen
Test Date:	2020-08-17~2020-08-23

Test Result: Compliance.

Antenna 1:

Middle Channel, $f_c = 763$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limits (ppm)
°C	V _{DC}	Hz	ppm	
-30	-48	-25	-0.03	1.0
-20		31	0.04	
-10		27	0.04	
0		16	0.02	
10		31	0.04	
20		0	0	
30		-9	-0.01	
40		25	0.03	
50		-14	-0.02	
20	-34.5	-8	-0.01	
20	-65.6	19	0.02	

Antenna 4:

Middle Channel, $f_c = 763$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limits (ppm)
°C	V _{DC}	Hz	ppm	
-30	-48	26	0.03	1.0
-20		-22	-0.03	
-10		-17	-0.02	
0		9	0.01	
10		14	0.02	
20		0	0	
30		-6	-0.01	
40		-18	-0.02	
50		27	0.04	
20	-34.5	26	0.03	
20	-65.6	-20	-0.03	

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