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Report Template Version: V04
Report Template Revision Date: 2018-07-06

Test Report

Report No. :	CQASZ20200600577E-05
Applicant:	SHENZHEN HOLATEK CO.,LTD.
Address of Applicant:	Rm.1001, Unit 4, Bldg. B, Kexing Science Park, Keyuan Road, Nanshan District, Shenzhen, P.R.C
Equipment Under Test (EUT):	
EUT Name:	Explorer
Model No.:	J50-2CA
Brand Name:	JMGO
FCC ID:	SMC-EXPLORER
Standards:	47 CFR Part 15, Subpart E
	KDB 789033 D02 General UNII Test Procedures New Rules v02
	KDB 558074 D01 Meas Guidance v05
Date of Receipt:	2020-06-19
Date of Test:	2020-06-19 to 2020-07-22
Date of Issue:	2020-07-22
Test Result :	**PASS***

***In the configuration tested, the EUT complied with the standards specified above**

Tested By: Jun Li

(Jun Li)

Reviewed By: Sheek.Luo

(Sheek Luo)

Approved By:

(Jack Ai)

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20200600577E-05	Rev.01	Initial report	2020-07-22

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart E Section 15.407 (b)(6)	ANSI C63.10-2013	PASS
Conducted Output Power and transmit power control mechanism	47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(4)(h)(1)	ANSI C63.10-2013	PASS
Emission Bandwidth	47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)	ANSI C63.10-2013	PASS
Peak Power Spectral Density	47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(5)	ANSI C63.10-2013	PASS
Frequency stability	47 CFR Part 15 Subpart E Section 15.407 (g)	ANSI C63.10-2013	PASS
Operation in the absence of information to the transmit	47 CFR Part 15 Subpart E Section 15.407 (c)	47 CFR Part 15 Subpart E	PASS
Radiated Spurious Emissions	47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(5)(6)(7)(8)	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart E Section 15.407 (b)(6)(7)(8)	ANSI C63.10-2013	PASS

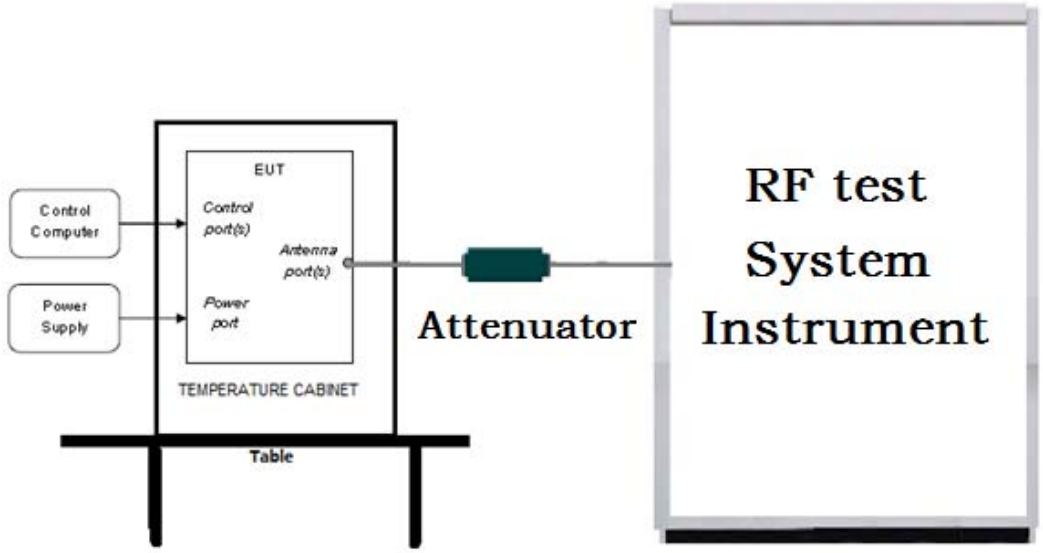
Remark:
The tested sample(s) and the sample information are provided by the client.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radiated Frequency.
CH: In this whole report CH means channel.
Volt: In this whole report Volt means Voltage.
Temp: In this whole report Temp means Temperature.
Humid: In this whole report Humid means humidity.
Press: In this whole report Press means Pressure.
N/A: In this whole report not application

3 Content

4 Test Requirement

4.1 Test setup

4.1.1 For Conducted test setup



4.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

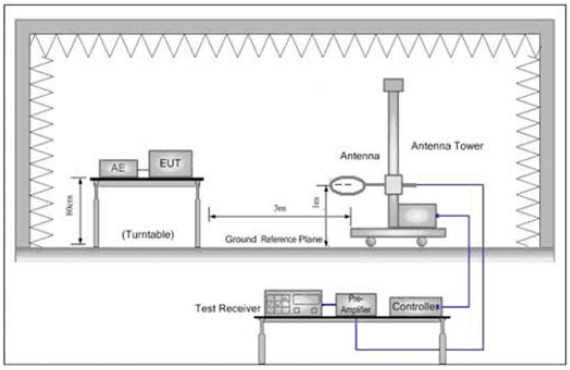


Figure 1. Below 30MHz

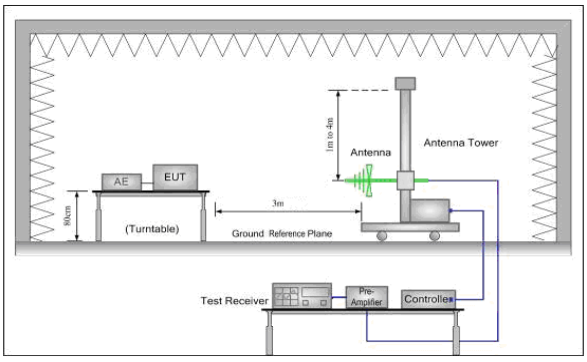


Figure 2. 30MHz to 1GHz

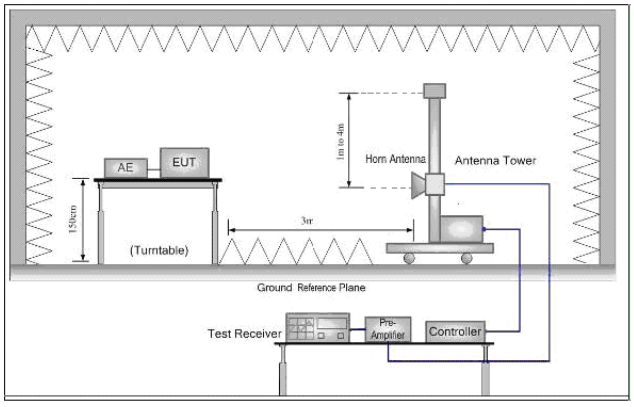
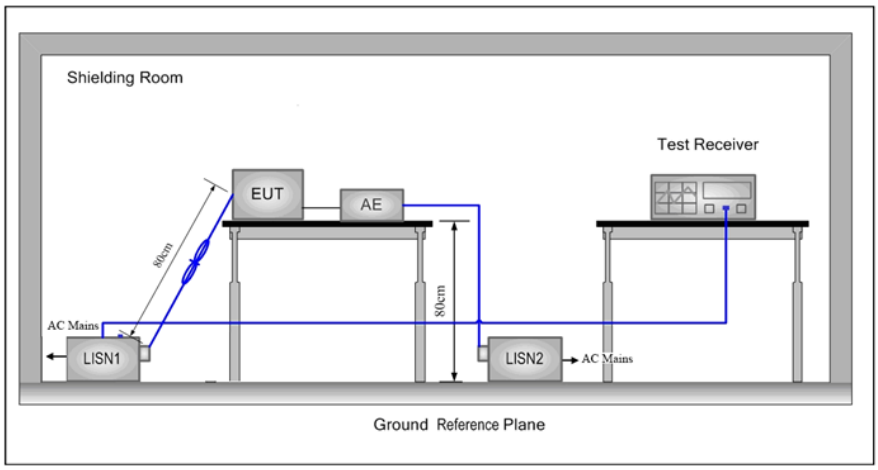


Figure 3. Above 1GHz

4.1.3 For Conducted Emissions test setup

Conducted Emissions setup



4.2 Test Environment

Operating Environment:		
Conducted Emissions:		
Temperature:	25.5 °C	
Humidity:	54 % RH	
Atmospheric Pressure:	1009mbar	
Radiated Emissions:		
Temperature:	25.5 °C	
Humidity:	54 % RH	
Atmospheric Pressure:	1009mbar	
Radio conducted item test (RF Conducted test room):		
Temperature:	28.7 °C	
Humidity:	62 % RH	
Atmospheric Pressure:	1009mbar	
Test Condition	Temperature (°C)	Voltage (V)
TN/VN	+15 to +35	10.8
TL/VL	-20	9.72
TH/VL	50	9.72
TL/VH	-20	11.88
TH/VH	50	11.88

Remark:

1)The EUT just work in such extreme temperature of -20 °C to 50 °C and the extreme voltage of 9.72 V to 11.88 V, so here the EUT is tested in the temperature of -20 °C to 50 °C and the voltage of 9.72V to 11.88V.

2VN: Normal Voltage; TN: Normal Temperature;

TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;

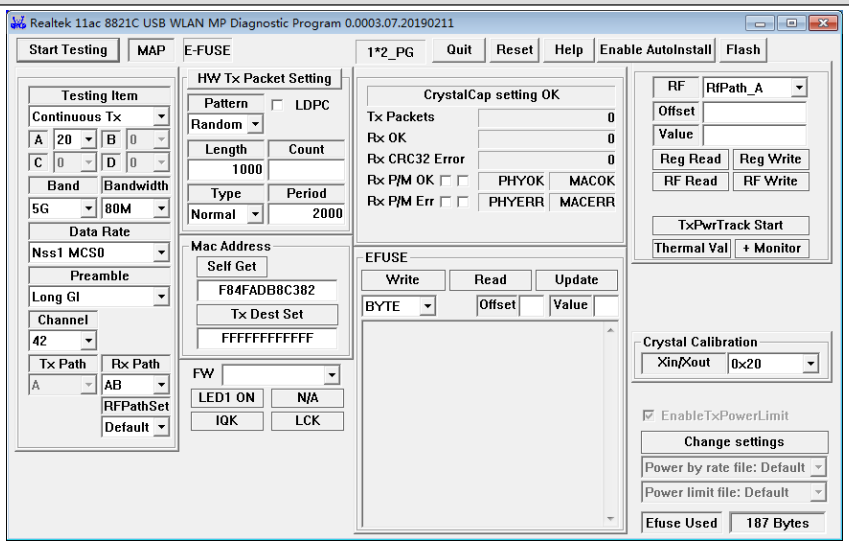
VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

4.3 Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11a/n/ac(20M)	5150MHz ~5250 MHz	Channel 36	Channel 40	Channel 48
		5180MHz	5200MHz	5240MHz
802.11n/ac(40M)	5150MHz ~5250 MHz	Channel 38	N/A	Channel 46
		5190MHz	N/A	5230MHz
802.11ac(80M)	5150MHz ~5250 MHz	N/A	Channel 42	N/A
		N/A	5210MHz	N/A
802.11a/n/ac(20M)	5725MHz ~5850 MHz	Channel 149	Channel 157	Channel 165
		5745MHz	5785MHz	5825MHz
802.11n/ac(40M)	5725MHz ~5850 MHz	Channel 151	N/A	Channel 159
		5755MHz	N/A	5795MHz
802.11ac(80M)	5725MHz ~5850 MHz	N/A	Channel 155	N/A
		N/A	5775MHz	N/A

Run Software:



Test mode:

Pre-scan under all rate at lowest channel for Ant1

Through Pre-scan, MCS0 is the worst case of 802.11a (20M);MCS0 is the worst case of 802.11n (20M) ;MCS0 is the worst case of 802.11ac (20M) ;MCS0 is the worst case of 802.11n(40M) ;MCS0 is the worst case of 802.11ac (40M) ;MCS0 is the worst case of 802.11ac(80M).

5 General Information

5.1 Client Information

Applicant:	SHENZHEN HOLATEK CO.,LTD.
Address of Applicant:	Rm.1001, Unit 4, Bldg. B, Kexing Science Park, Keyuan Road, Nanshan District, Shenzhen, P.R.C
Manufacturer:	SHENZHEN HOLATEK CO.,LTD.
Address of Manufacturer:	Rm.1001, Unit 4, Bldg. B, Kexing Science Park, Keyuan Road, Nanshan District, Shenzhen, P.R.C
Factory:	SHENZHEN HOLATEK CO.,LTD.
Address of Factory:	5th floor, Building A1, Yingzhan Industrial Park, Longtian Street, Pingshan New District, Shenzhen, P.R.C

5.2 General Description of EUT

Product Name:	Explorer
Model No.:	J50-2CA
Trade Mark:	JMGO
EUT Supports Radios application	Bluetooth Dual mode 2402-2480MHz 2.4GHz: Wi-Fi:802.11b/g/n(HT20): 2412MHz ~2462 MHz; 802.11b/g/n(HT40): 2422MHz ~2452 MHz 5GHz: Wi-Fi: U-NII-1: 5.15-5.25GHz; U-NII-3: 5.725-5.850GHz
Hardware Version:	M322 MB VerC, M322 FB VerC, M322 KB VerA, M322 optical VerA
Software Version:	1.0.5
Power Supply:	lithium battery: DC 10.8V 5.2Ah, Charge by adapter
Adapter:	Mode: RJ-AS140420 Input: 100-240V 50/60Hz, 2.0A Output: DC 14V 4.2A

5.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11a/n/ac(20M): 5150MHz ~5250 MHz IEEE802.11n/ac(40M): 5150MHz ~5250 MHz IEEE802.11ac(80M): 5150MHz ~5250 MHz IEEE 802.11a/n/ac(20M): 5725MHz ~5850 MHz IEEE802.11n/ac(40M): 5725MHz ~5850 MHz IEEE802.11ac(80M): 5725MHz ~5850 MHz
Channel Numbers:	IEEE 802.11a/n/ac(20M): 5150MHz ~5250MHz/ 4 channel IEEE 802.11n/ac(40M): 5150MHz ~5250MHz/ 2 channel IEEE 802.11ac(80M): 5150MHz ~5250MHz/ 1 channel IEEE 802.11a/n/ac(20M): 5725MHz ~5850MHz/ 5 channel IEEE 802.11n/ac(40M): 5725MHz ~5850MHz/ 2 channel IEEE 802.11ac(80M): 5725MHz ~5850MHz/ 1 channel
Type of Modulation:	OFDM
Sample Type:	☒ Mobile ☐ Portable ☐ Fix Location
Test Power Grade:	N/A
Test Software of EUT:	RTL8821CU Tool (manufacturer declare)
Antenna Type:	Internal Antenna
Antenna gain:	3.04dBi@Band 1, 4.42dBi@Band 4
Test Voltage:	DC 10.8V

Operation Frequency each of channel

For 802.11a/n/ac(20M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz
For 802.11a/n/ac(20M) Operation in the 5725MHz ~5850 MHz band			
Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz	NA	NA

For 802.11n/ac(40M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz
For 802.11n/ac(40M) Operation in the 5725MHz ~5850 MHz band			
Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

For 802.11ac(80M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	NA	NA
42	5210MHz	NA	NA
For 802.11ac(80M) Operation in the 5725MHz ~5850 MHz band			
Channel	Frequency	NA	NA
155	5775MHz	NA	NA

5.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Certification	Supplied by
PC	Lenovo	ThinkPad E450c	FCC	CQA

5.5 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

5.6 Test Facility

• A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

• FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

5.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	3×10^{-8}
2	RF power, conducted	0.86dB
3	Radiated Spurious emission test	5.12dB (Below 1GHz)
		4.6dB (Above 1GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
5	Temperature test	0.8°C
6	Humidity test	2.0%
7	DC power voltages	0.5%

6 Equipment List

Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2019/10/25	2020/10/24
Spectrum analyzer	R&S	FSU26	CQA-038	2019/10/25	2020/10/24
Spectrum analyzer	R&S	FSV40	CQA-075	2020/6/11	2021/6/10
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	4012339	2019/10/25	2020/10/24
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2019/10/25	2020/10/24
Preamplifier	EMCI	EMC184055SE	CQA-089	2019/9/25	2020/9/24
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2019/10/21	2020/10/20
Bilog Antenna	R&S	HL562	CQA-011	2019/9/26	2020/9/25
Horn Antenna	R&S	HF906	CQA-012	2019/9/26	2020/9/25
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2019/9/25	2020/9/24
Coaxial Cable (Above 1GHz)	CQA	N/A	C007	2019/9/26	2020/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C013	2019/9/26	2020/9/25
Antenna Connector	CQA	RFC-01	CQA-080	2019/9/26	2020/9/25
Power Sensor	KEYSIGHT	U2021XA	CQA-30	2019/9/26	2020/9/25
N1918A Power Analysis Manager Power Panel	Agilent	N1918A	CQA-074	2019/9/26	2020/9/25
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2019/9/26	2020/9/25
EMI Test Receiver	R&S	ESR7	CQA-005	2019/10/25	2020/10/24
LISN	R&S	ENV216	CQA-003	2019/10/23	2020/10/22
Coaxial cable	CQA	N/A	CQA-C009	2019/9/26	2020/9/25
high-low temperature chamber	Auchno	OJN-9606	CQA-S003	2019/9/25	2020/9/24
DC power	KEYSIGHT	E3631A	CQA-028	2019/9/26	2020/9/25

Note:

The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

7 Radio Technical Requirements Specification

Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15E	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
3	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) device part 15, subpart E
4	KDB 662911 D01 Multiple Transmitter Output v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part15E Section 15.407 (a)(1)(2)	KDB789033	Emission Bandwidth and Occupied Bandwidth	PASS	Appendix A)
Part15E Section 15.407 (a)(1)(2)(4)(h)(1)	KDB789033 / KDB 662911	Conducted Output Power and transmit power control mechanism	PASS	Appendix B)
Part15E Section 15.407 (a)(1)(2)(5)	KDB789033 / KDB 662911	Power Spectral Density	PASS	Appendix C)
Part15E Section 15.407 (g)	KDB789033	Frequency stability	PASS	Appendix D)
Part15C Section 15.203	ANSI C63.10	Antenna Requirement	PASS	Appendix E)
Part15E Section 15.407 (c)	Section 15.407	Operation in the absence of information to the transmit	PASS	Appendix F)
Part15E Section 15.407 (b)(6)	ANSI C63.10	AC Power Line Conducted Emission	PASS	Appendix G)
Part15E Section 15.407 (b)(6)(7)(8)	KDB789033	Restricted bands around fundamental frequency(Radiated Emission)	PASS	Appendix H)
Part15E Section 15.407 (b)(1)(2)(3)(5)(6)(7)(8)	KDB789033	Radiated Spurious Emissions	PASS	Appendix I)

Appendix A): Emission Bandwidth

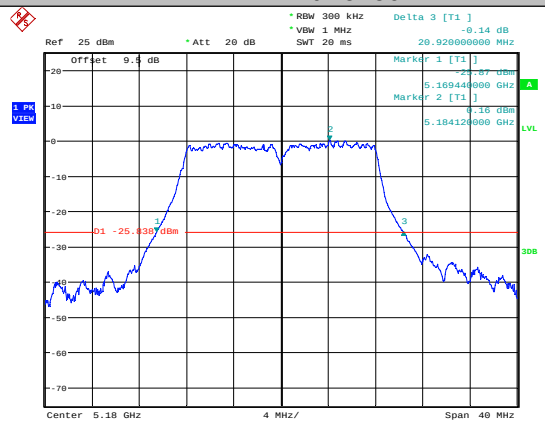
Result Table

Test Mode	Antenna	Channel	EBW[MHz]	OBW[MHz]	Verdict
11A	Ant1	5180	20.920	16.745	PASS
11A	Ant1	5200	21.000	16.800	PASS
11A	Ant1	5240	21.400	16.785	PASS
11A	Ant1	5745	16.560	16.560	PASS
11A	Ant1	5785	16.520	16.820	PASS
11A	Ant1	5825	16.600	16.860	PASS
11N20	Ant1	5180	21.720	17.775	PASS
11N20	Ant1	5200	21.760	17.800	PASS
11N20	Ant1	5240	21.840	17.785	PASS
11N20	Ant1	5745	17.720	17.810	PASS
11N20	Ant1	5785	17.760	17.820	PASS
11N20	Ant1	5825	17.720	17.870	PASS
11N40	Ant1	5190	42.400	36.250	PASS
11N40	Ant1	5230	42.800	36.420	PASS
11N40	Ant1	5755	36.560	36.290	PASS
11N40	Ant1	5795	36.560	36.220	PASS
11AC20	Ant1	5180	21.680	17.780	PASS
11AC20	Ant1	5200	21.760	17.810	PASS
11AC20	Ant1	5240	21.880	17.795	PASS
11AC20	Ant1	5745	17.720	17.840	PASS
11AC20	Ant1	5785	17.760	17.840	PASS
11AC20	Ant1	5825	17.680	17.885	PASS
11AC40	Ant1	5190	42.480	36.230	PASS
11AC40	Ant1	5230	43.760	36.410	PASS
11AC40	Ant1	5755	36.560	36.280	PASS
11AC40	Ant1	5795	36.560	36.200	PASS
11AC80	Ant1	5210	83.200	75.900	PASS
11AC80	Ant1	5775	76.640	76.040	PASS

Test Graph

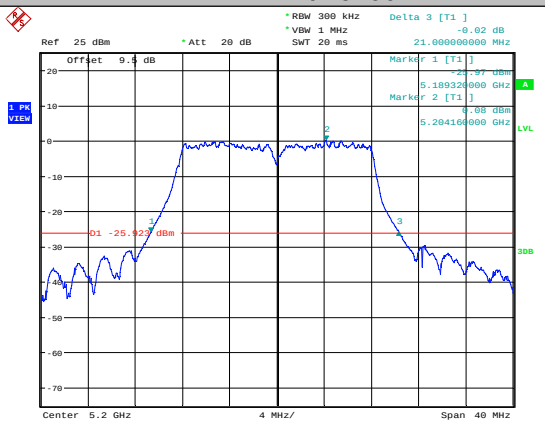
EBW:

11A-Ant1-5180



Date: 30.JUN.2020 16:26:50

11A-Ant1-5200



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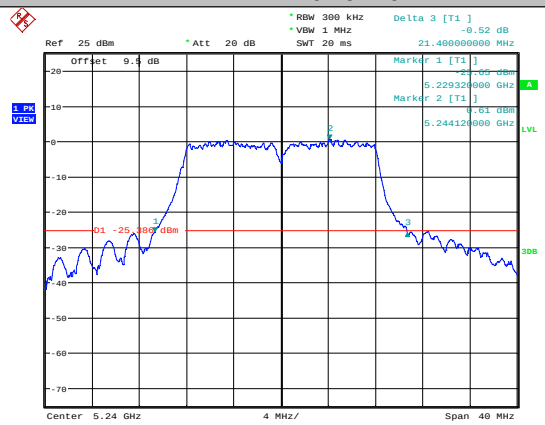
11A-Ant1-5240



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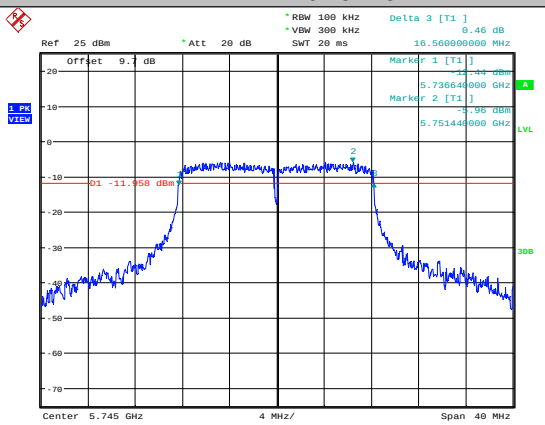
11A-Ant1-5745



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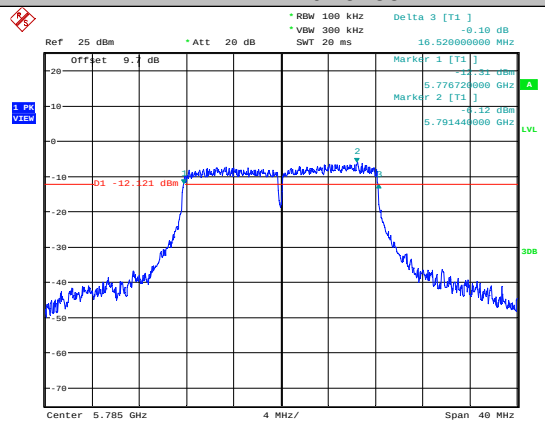
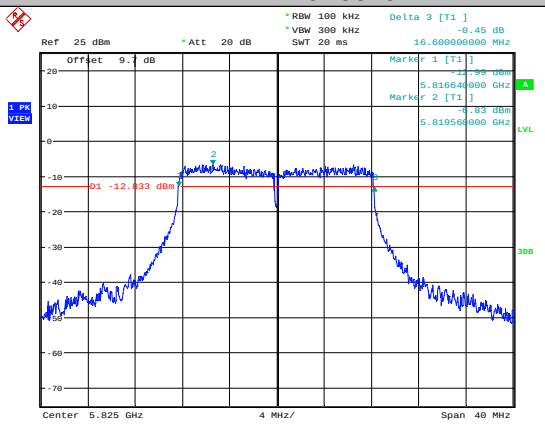
11A-Ant1-5785



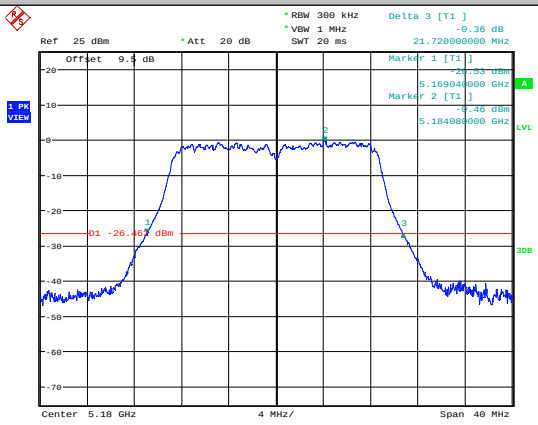
Date: 30.JUN.2020 16:48:27

11A-Ant1-5825



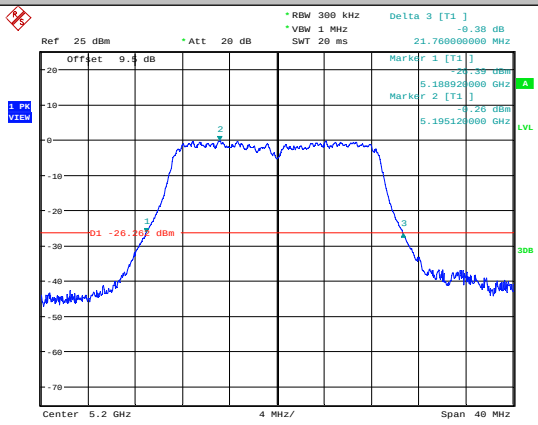
Date: 30.JUN.2020 16:52:23

11N20SISO-Ant1-5180



Date: 30.JUN.2020 16:57:26

11N20SISO-Ant1-5200



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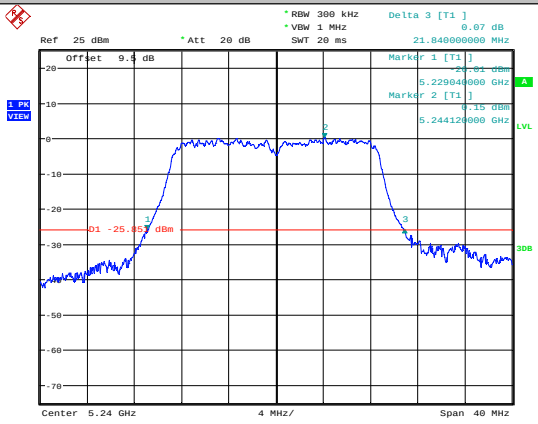
11N20SISO-Ant1-5240



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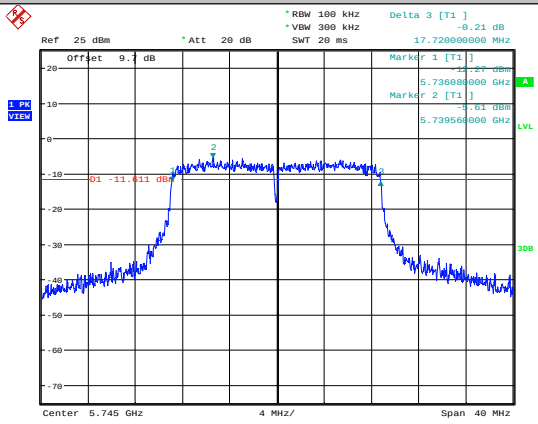
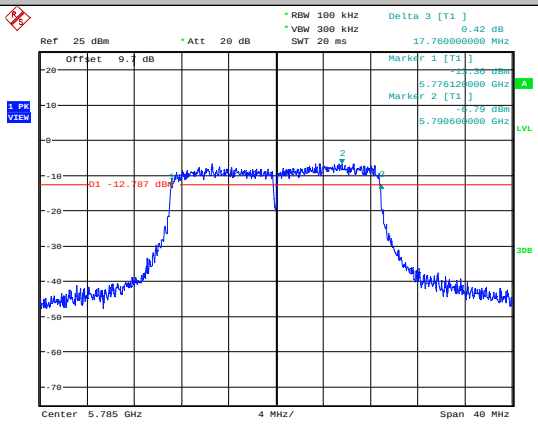
11N20SISO-Ant1-5745



Date: 30.JUN.2020 17:12:35

11N20SISO-Ant1-5785



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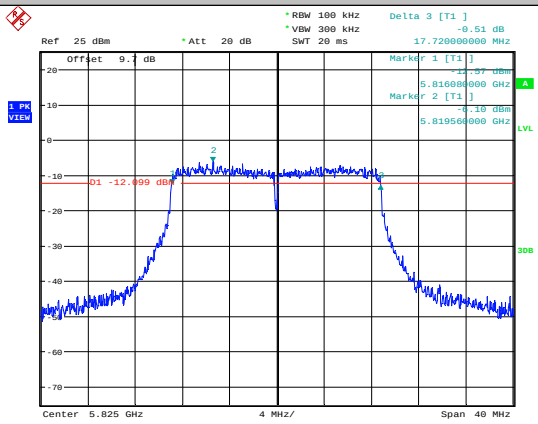
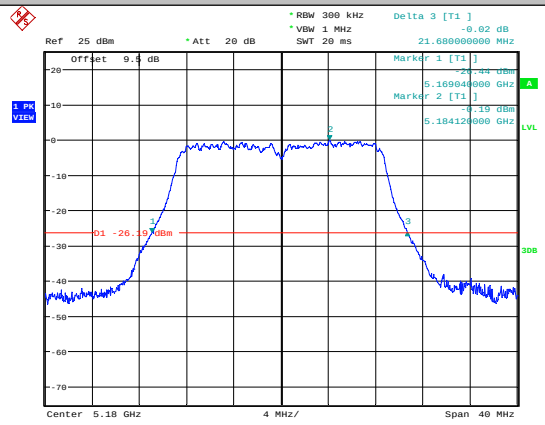


Date: 30.JUN.2020 17:20:45

11AC20SISO-Ant1-5180



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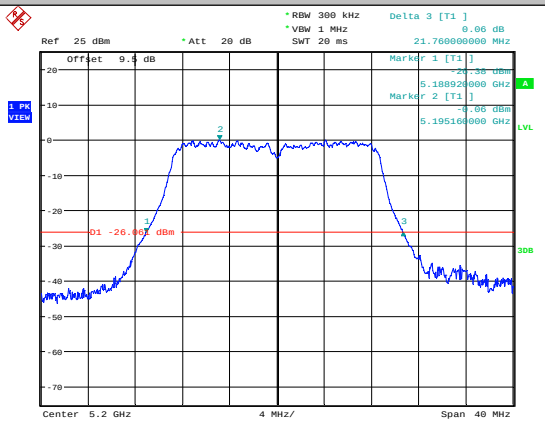

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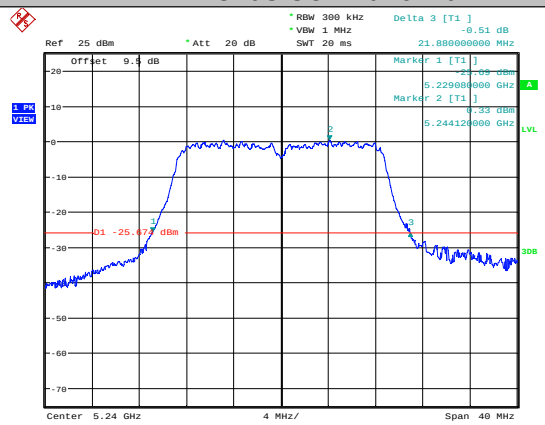

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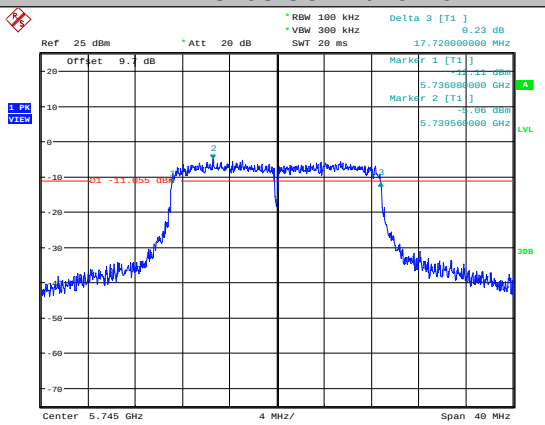

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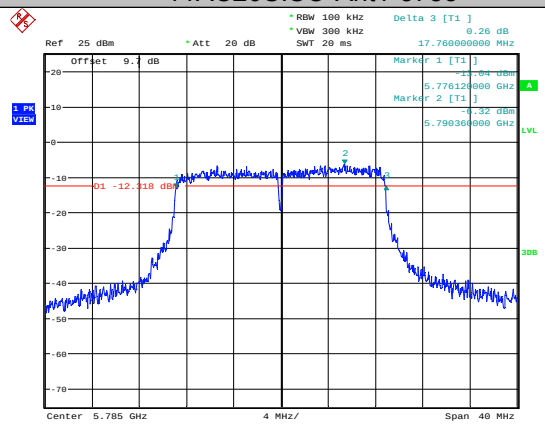

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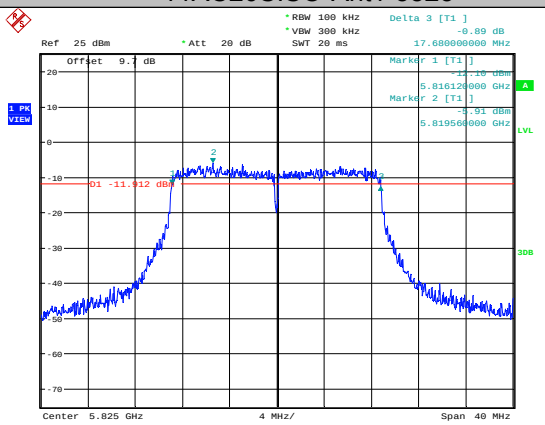

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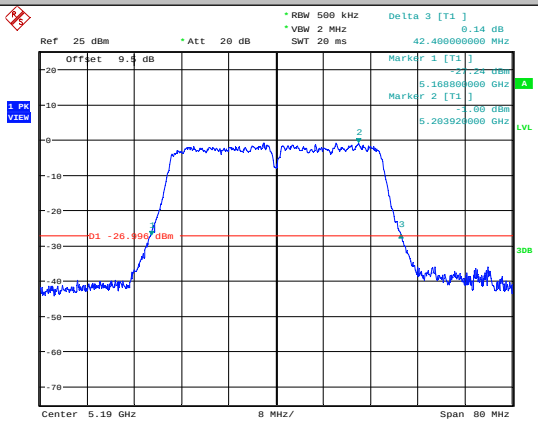

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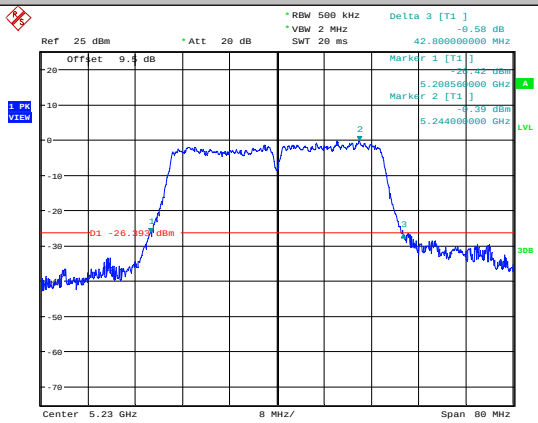

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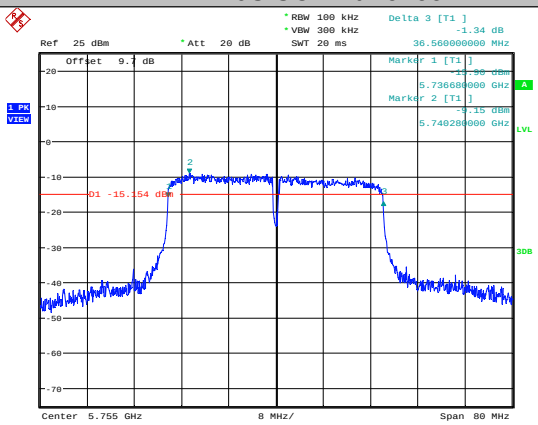

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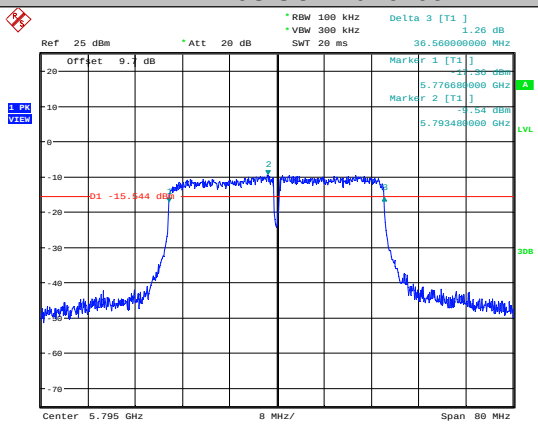

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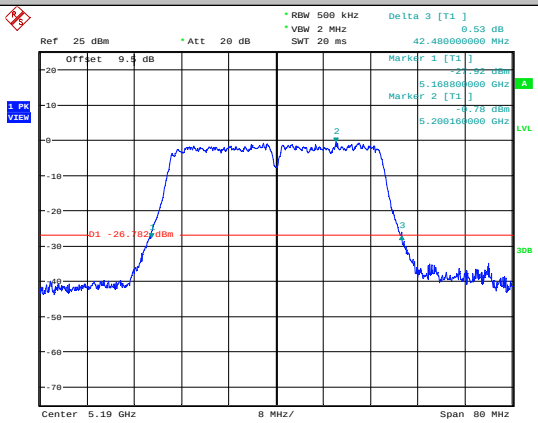

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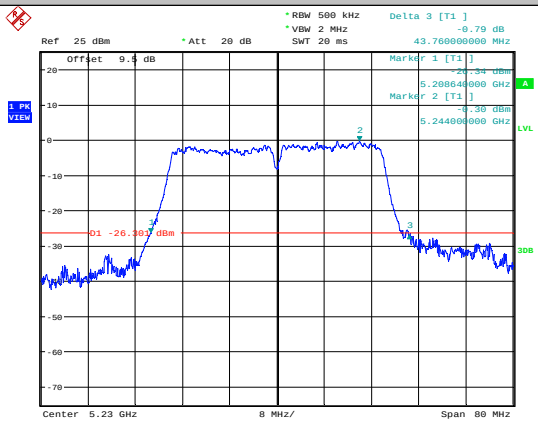

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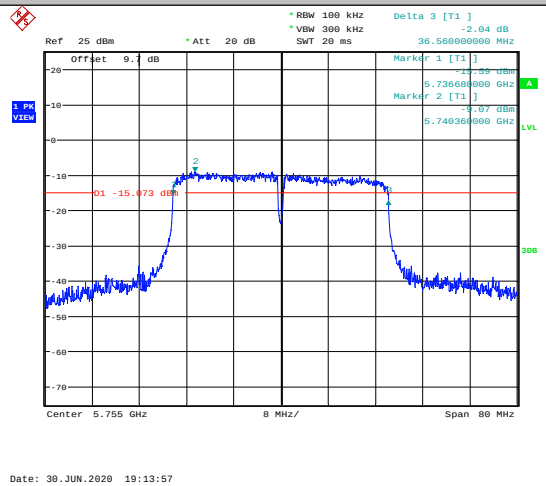
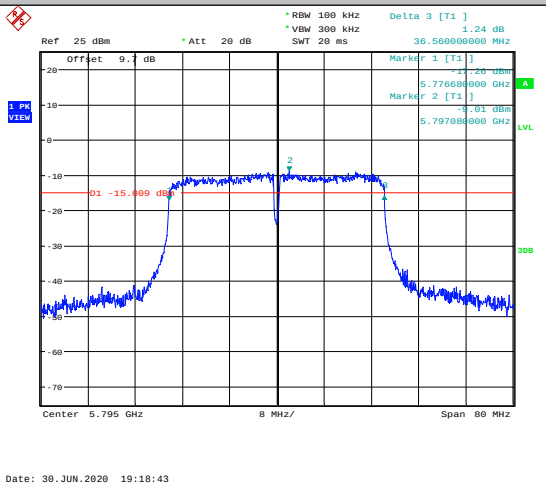
 Date: 30.JUN.2020 19:13:57	 Date: 30.JUN.2020 19:18:43
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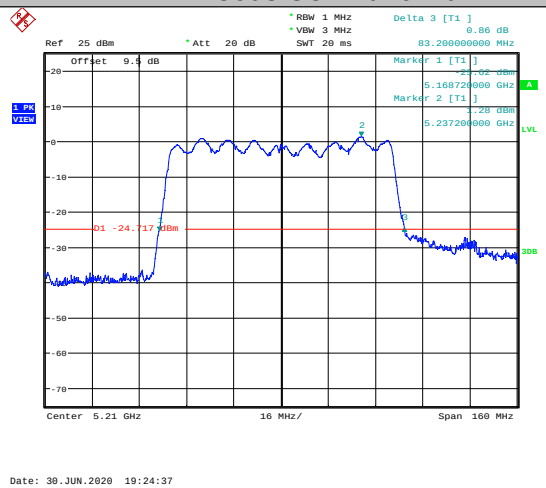
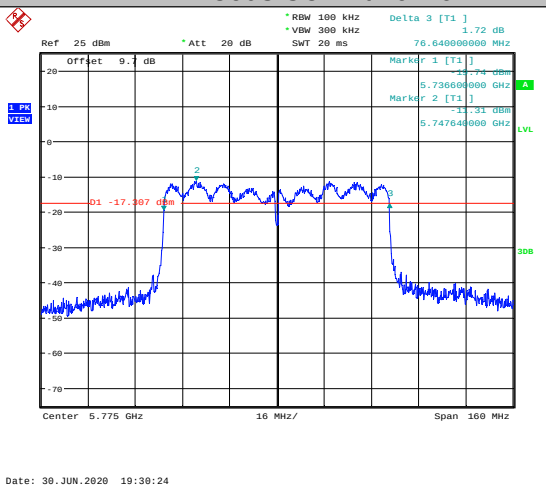
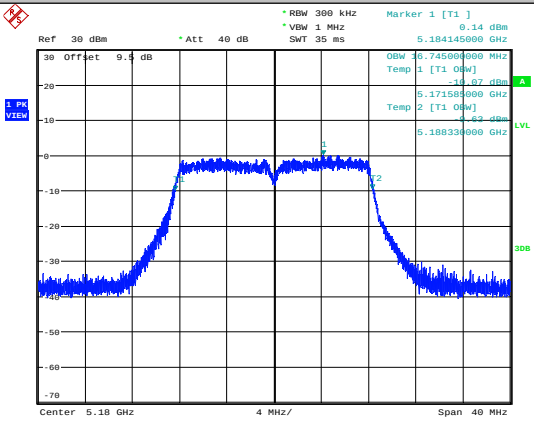
 Date: 30.JUN.2020 19:24:37	 Date: 30.JUN.2020 19:30:24

OBW:

11A-Ant1-5180



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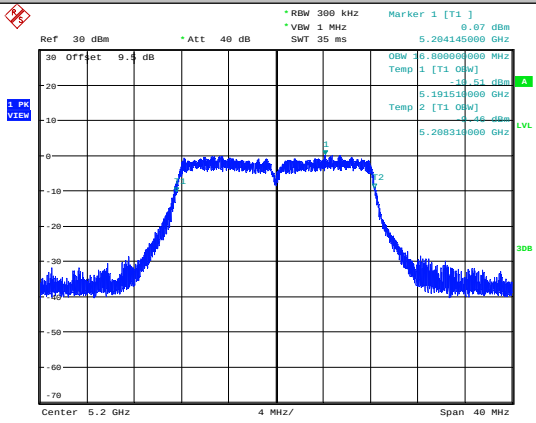

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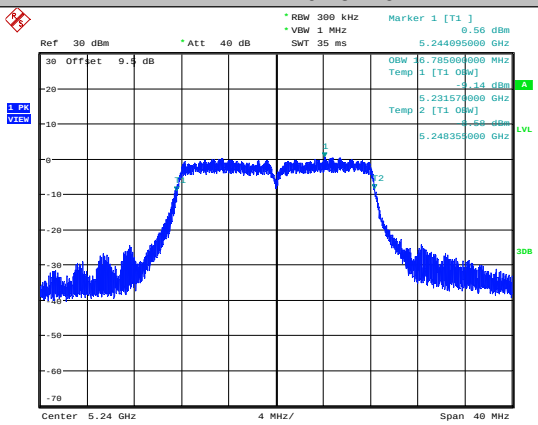

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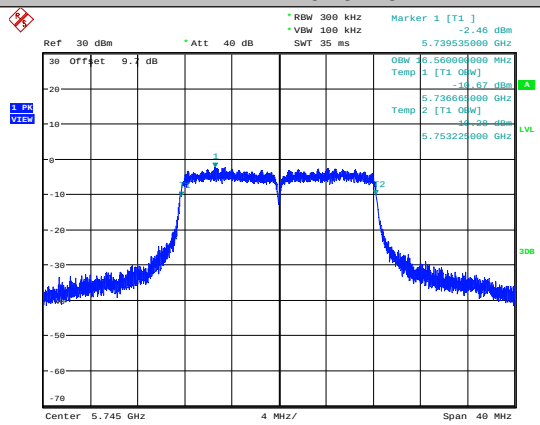

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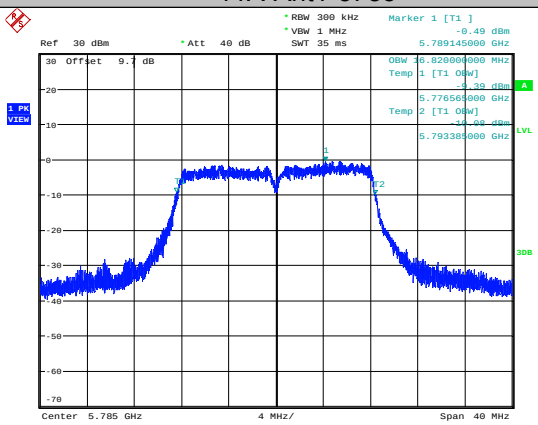

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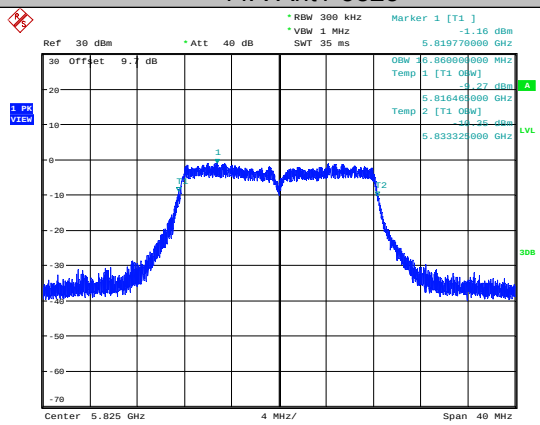

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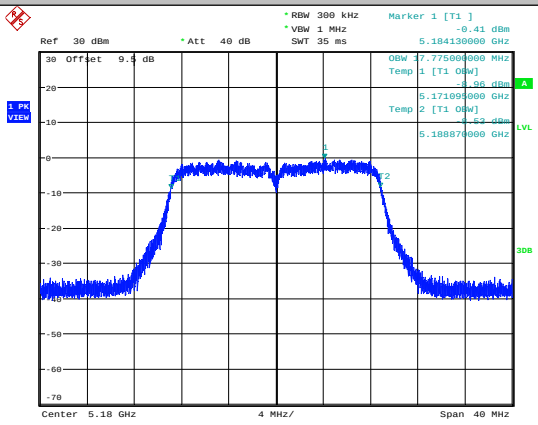

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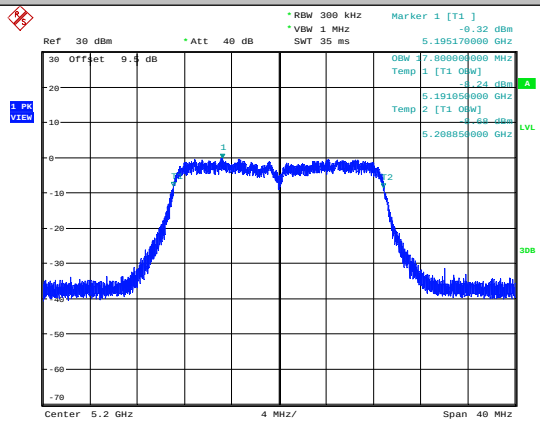

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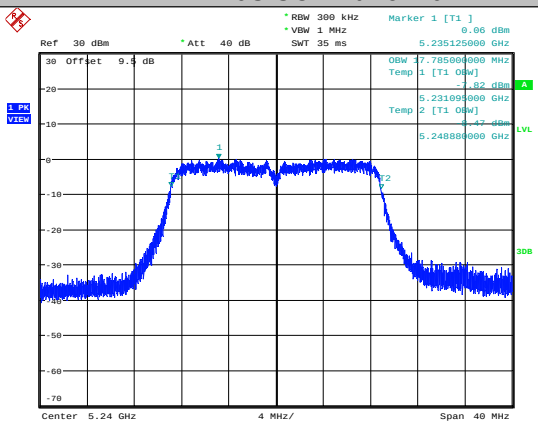

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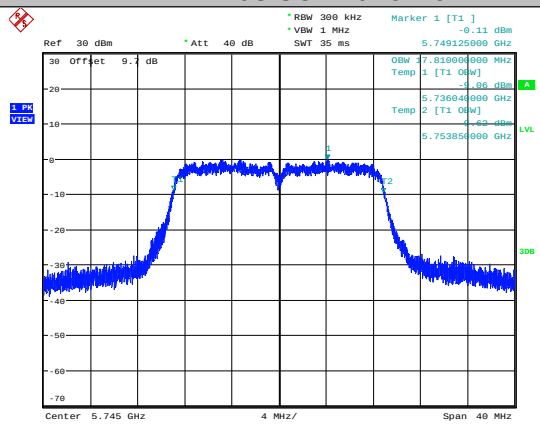

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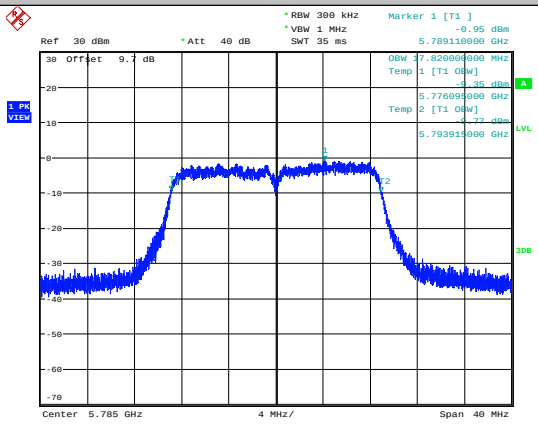
11N20SISO-Ant1-5785



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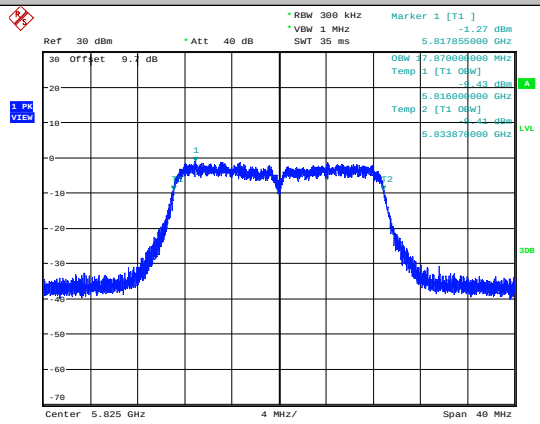

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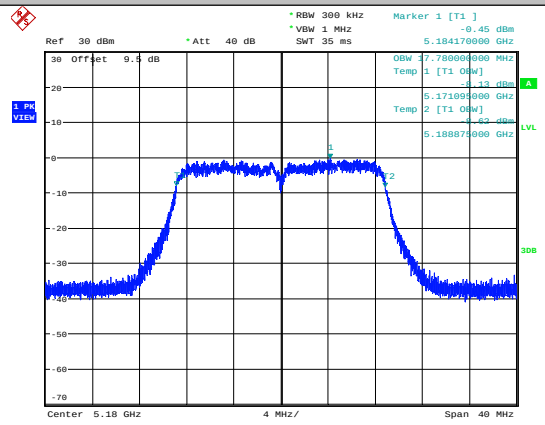

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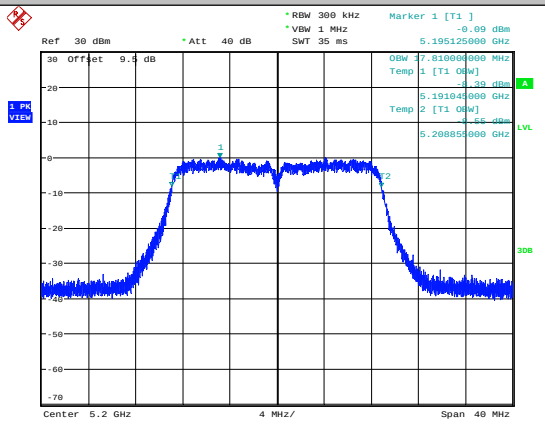

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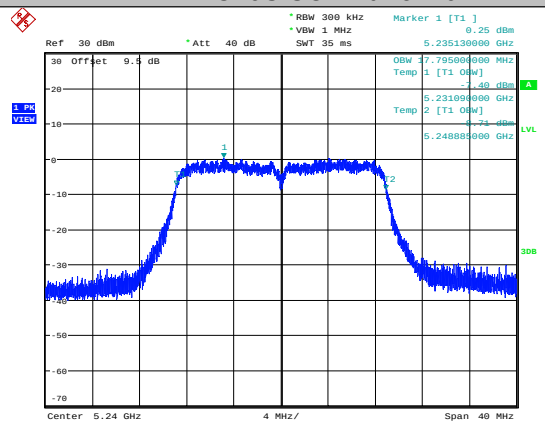

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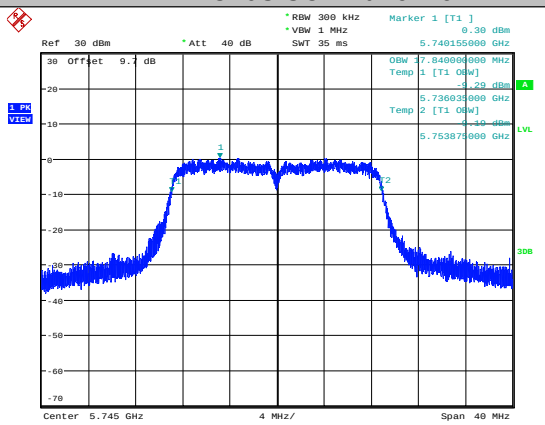

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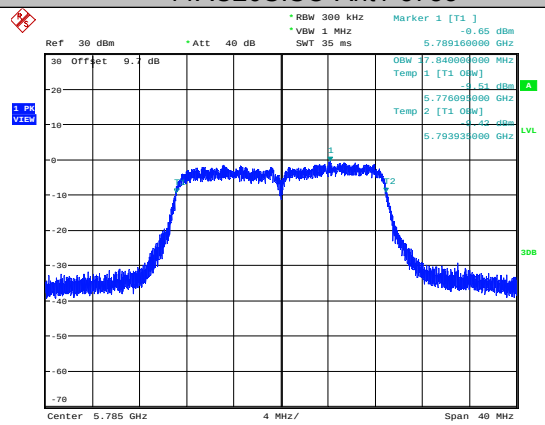

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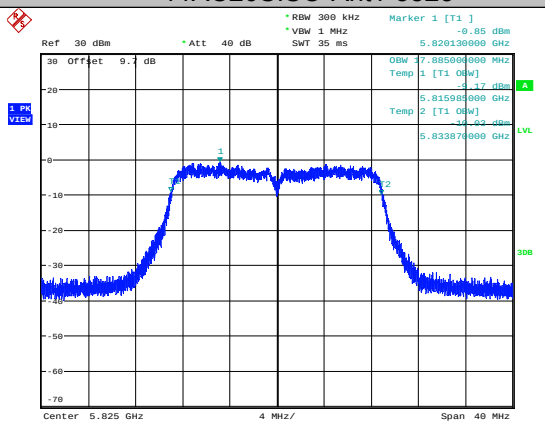

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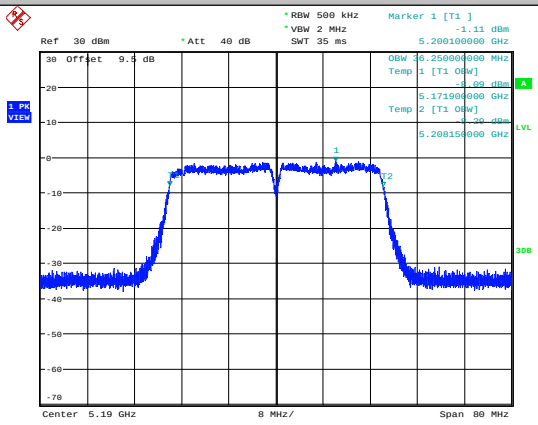

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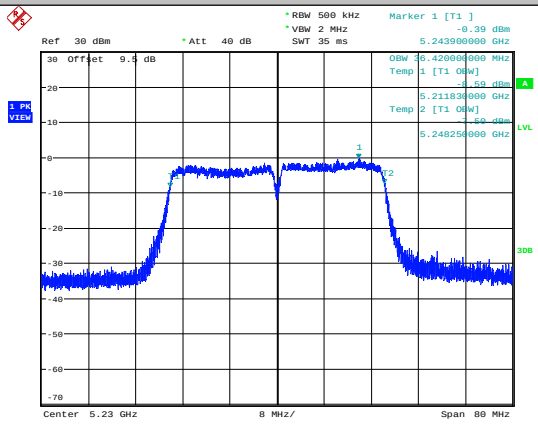

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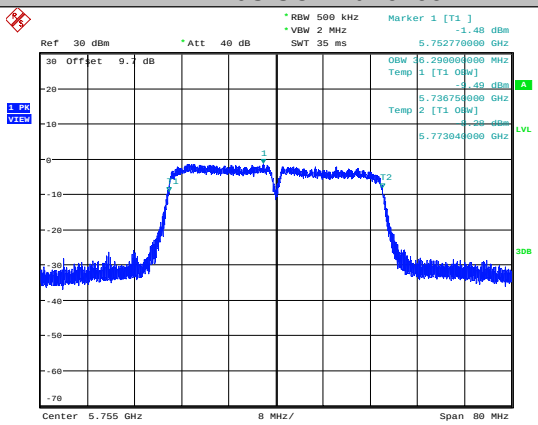

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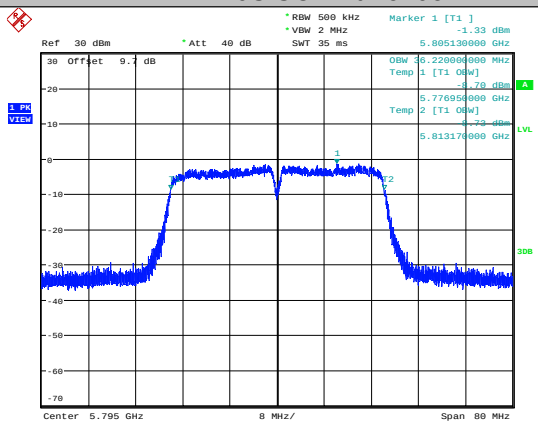

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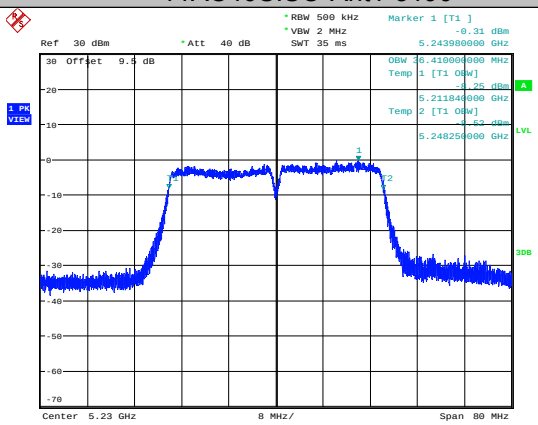

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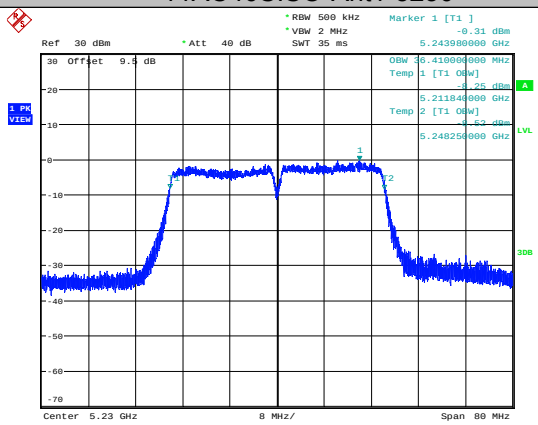
11AC40SISO-Ant1-5230



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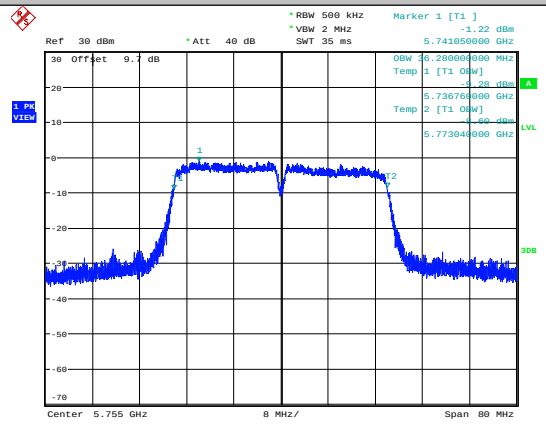
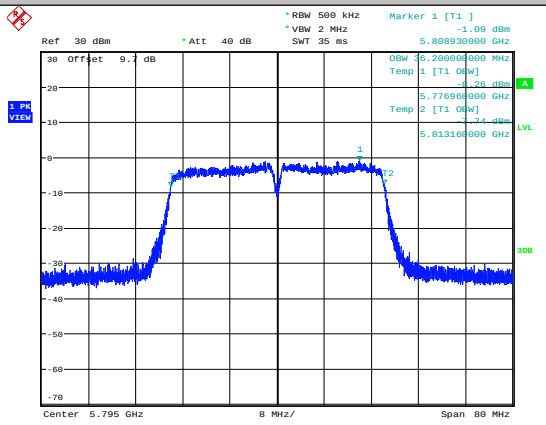
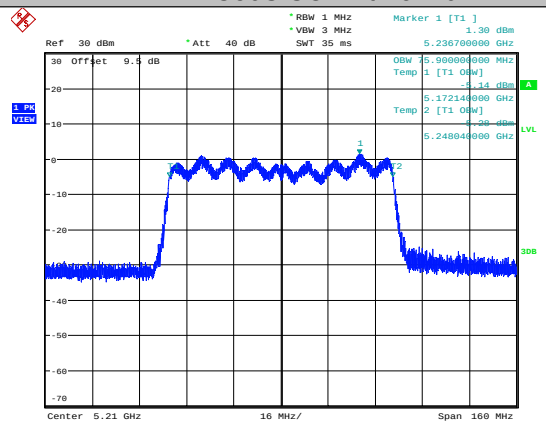
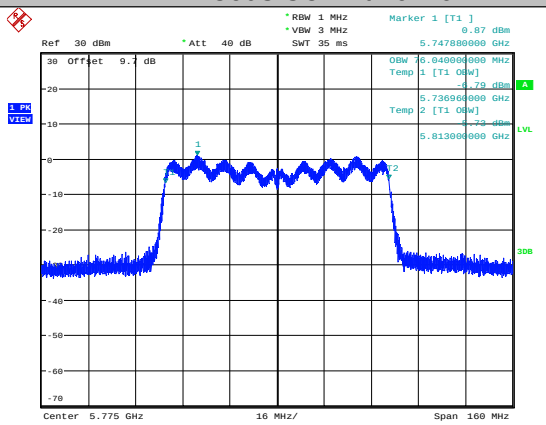
11N40SISO-Ant1-5755	11N40SISO-Ant1-5795
 Date: 30.JUN.2020 19:14:18	 Date: 30.JUN.2020 19:19:03
11AC80SISO-Ant1-5210	11AC80SISO-Ant1-5775
 Date: 30.JUN.2020 19:24:58	 Date: 30.JUN.2020 19:30:44

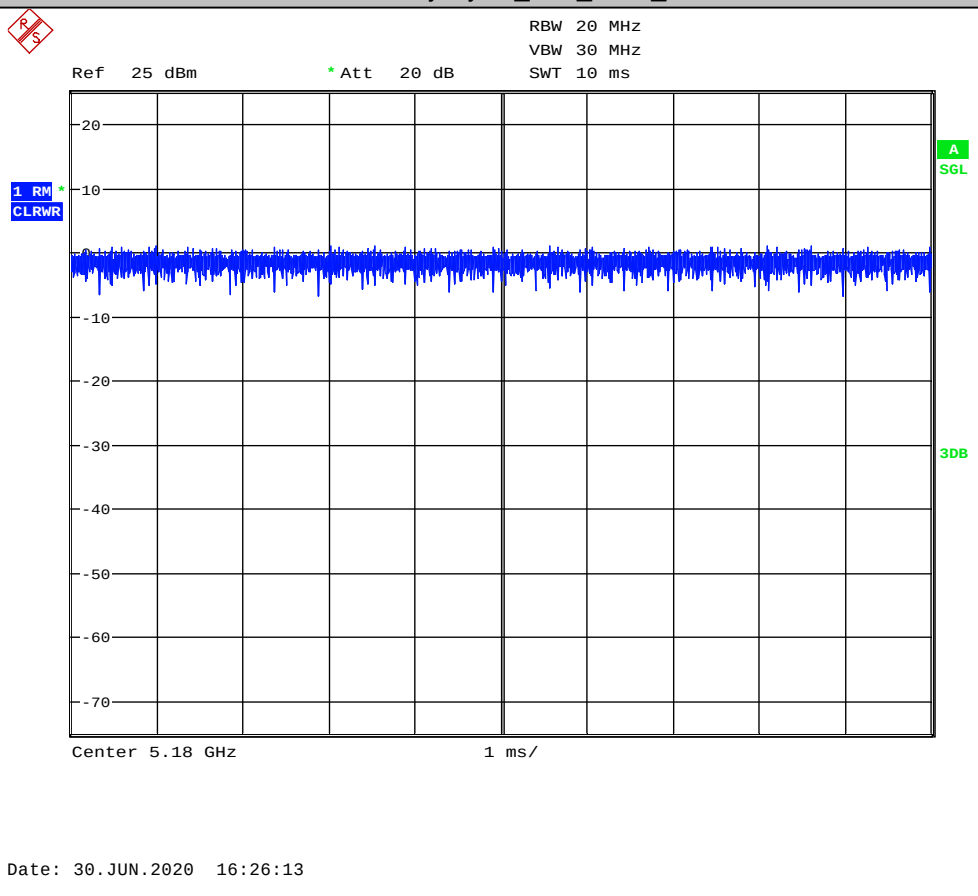
Appendix B): Maximum Conduct Output Power

Duty Cycle (x)

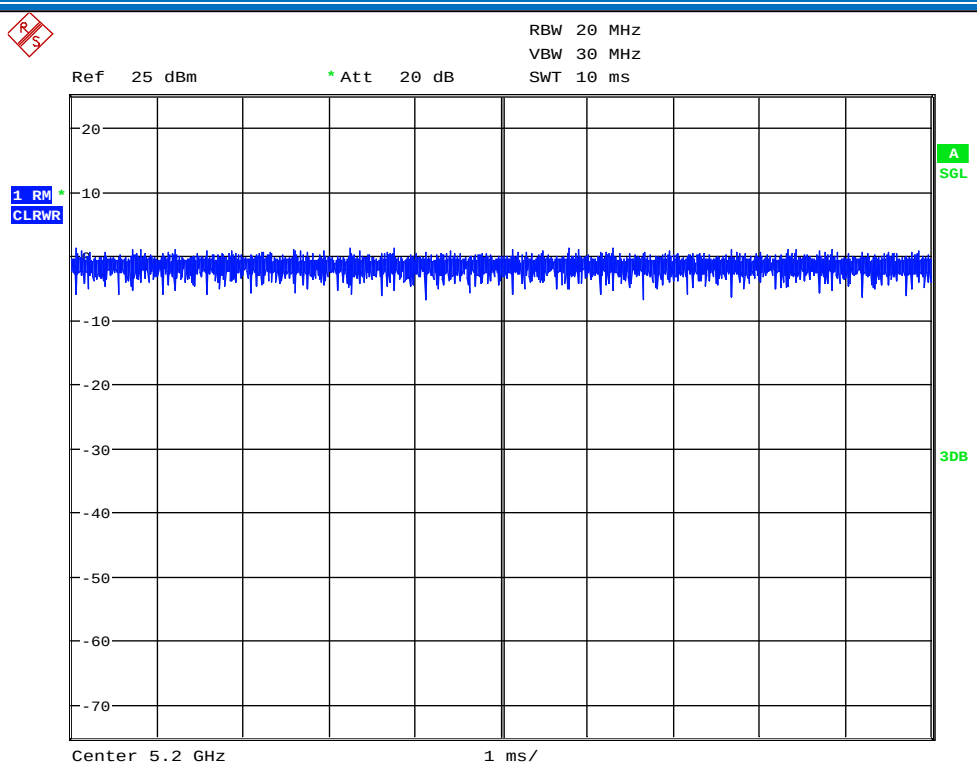
Test Mode	Test Channel	Ant	Duty Cycle[%]	10log(1/x) Factor[dB]
11A	5180	Ant1	100	0.00
11A	5200	Ant1	100	0.00
11A	5240	Ant1	100	0.00
11A	5745	Ant1	100	0.00
11A	5785	Ant1	100	0.00
11A	5825	Ant1	100	0.00
11N20	5180	Ant1	100	0.00
11N20	5200	Ant1	100	0.00
11N20	5240	Ant1	100	0.00
11N20	5745	Ant1	100	0.00
11N20	5785	Ant1	100	0.00
11N20	5825	Ant1	100	0.00
11N40	5190	Ant1	100	0.00
11N40	5230	Ant1	100	0.00
11N40	5755	Ant1	100	0.00
11N40	5795	Ant1	100	0.00
11AC20	5180	Ant1	100	0.00
11AC20	5200	Ant1	100	0.00
11AC20	5240	Ant1	100	0.00
11AC20	5745	Ant1	100	0.00
11AC20	5785	Ant1	100	0.00
11AC20	5825	Ant1	100	0.00
11AC40	5190	Ant1	100	0.00
11AC40	5230	Ant1	100	0.00
11AC40	5755	Ant1	100	0.00
11AC40	5795	Ant1	100	0.00
11AC80	5210	Ant1	100	0.00

11AC80	5775	Ant1	100	0.00

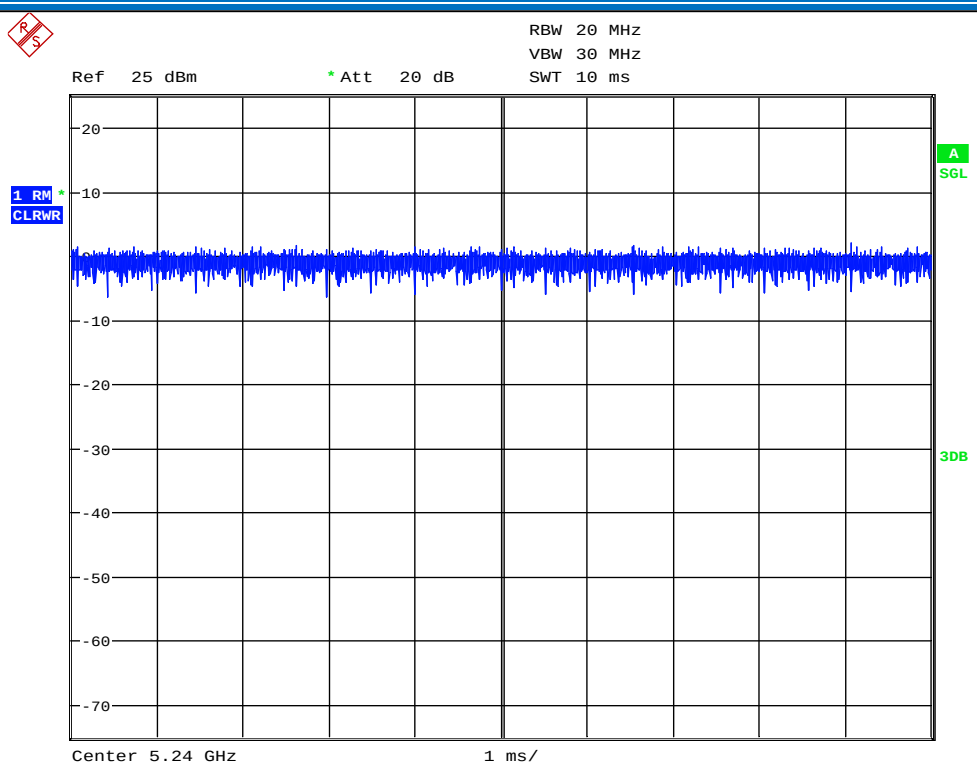
Duty Cycle_11A_5180_Ant1



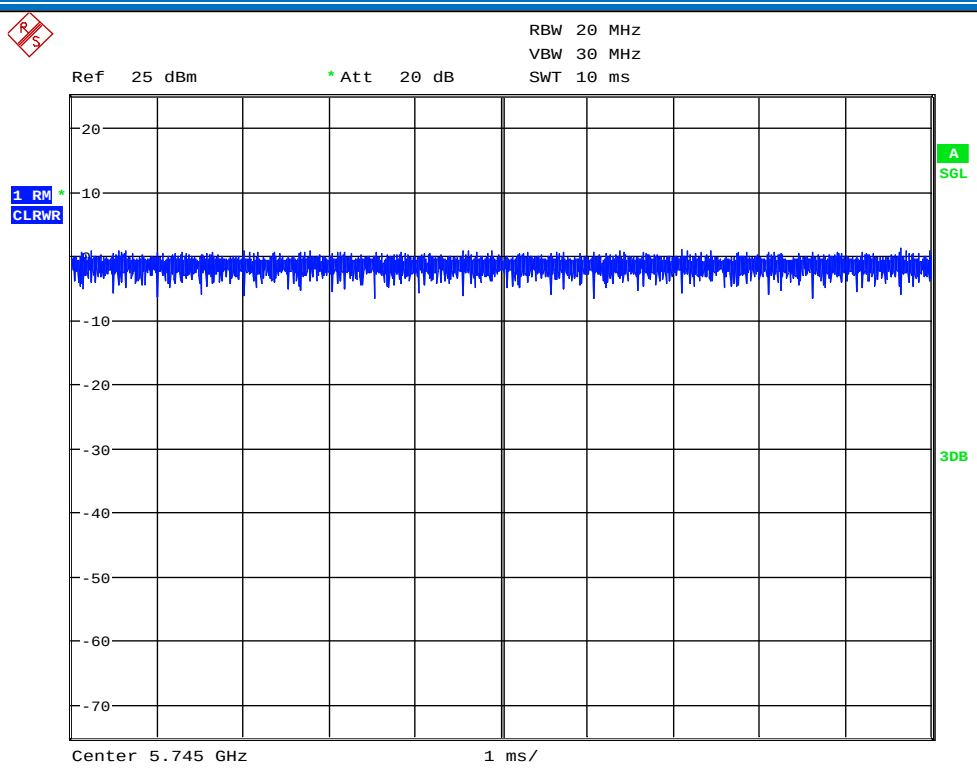
Duty Cycle_11A_5200_Ant1



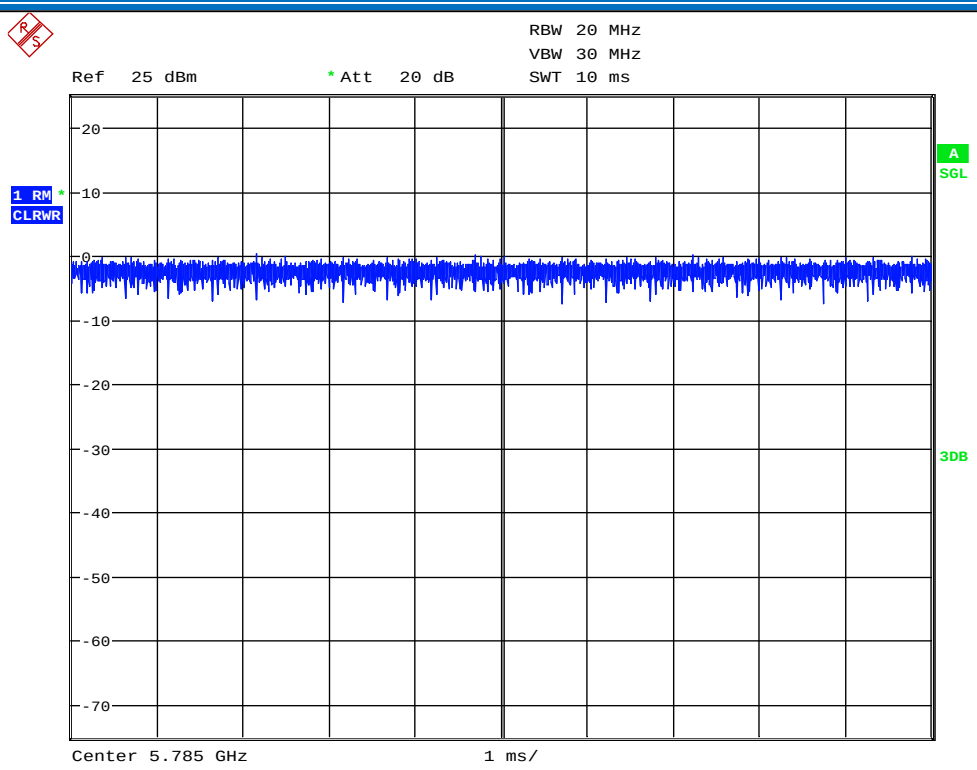
Duty Cycle_11A_5240_Ant1



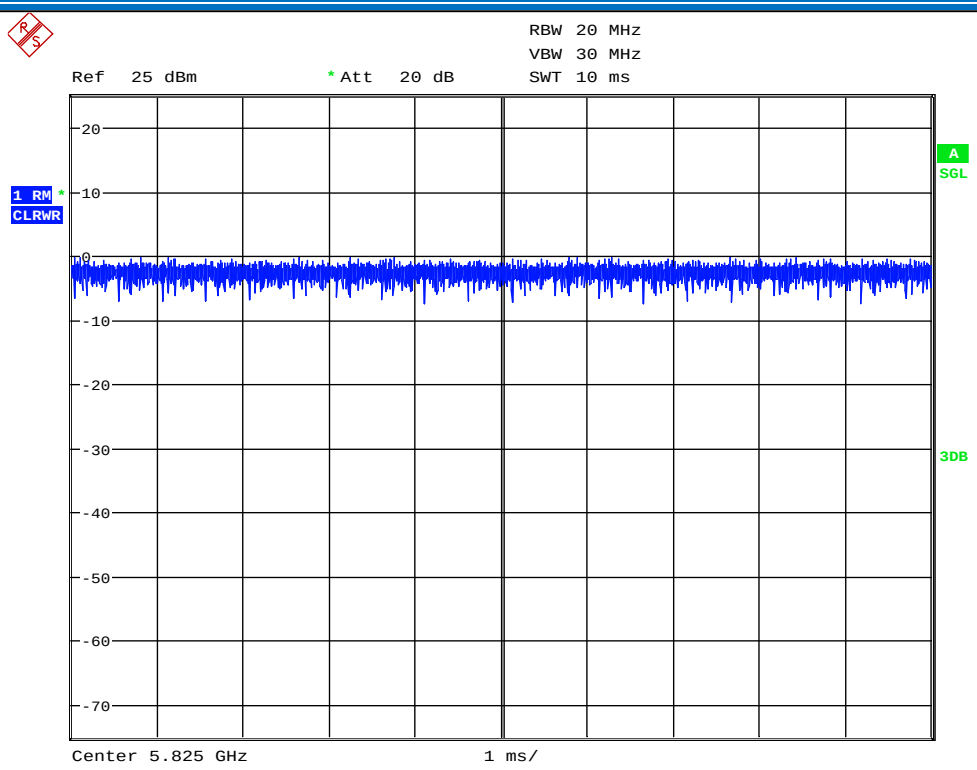
Duty Cycle_11A_5745_Ant1



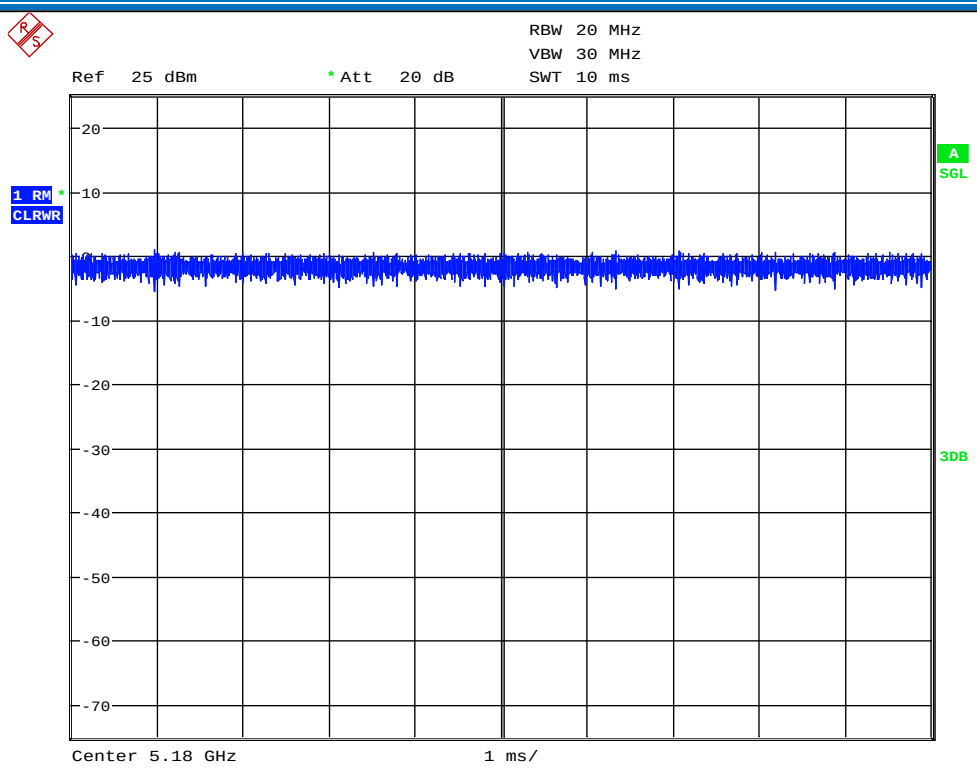
Duty Cycle_11A_5785_Ant1



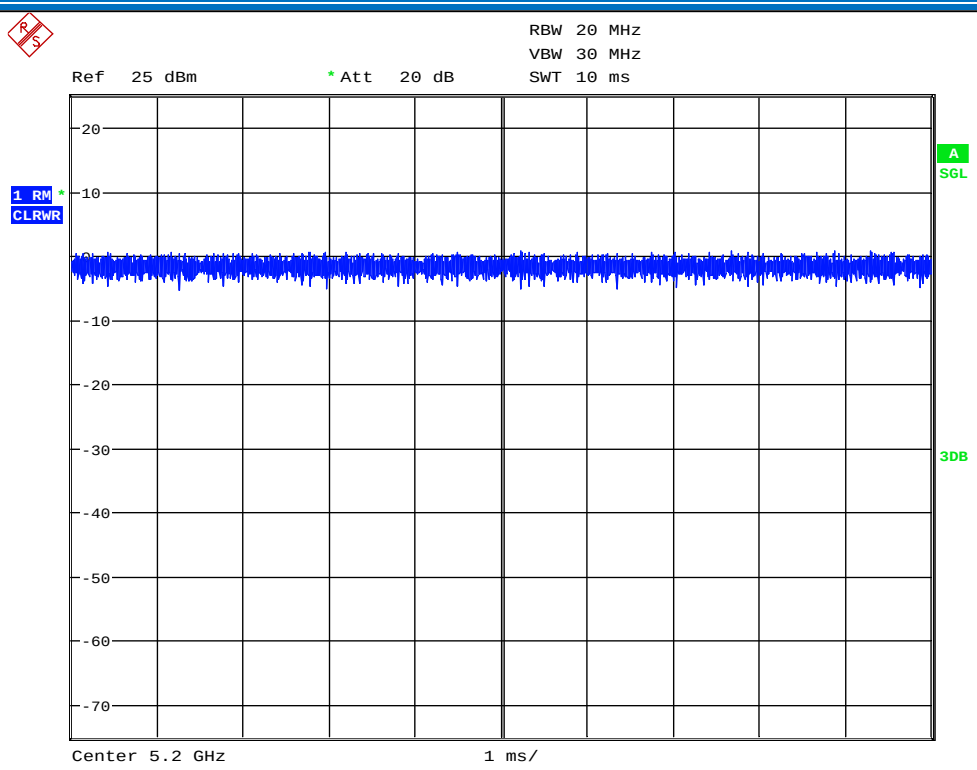
Duty Cycle_11A_5825_Ant1



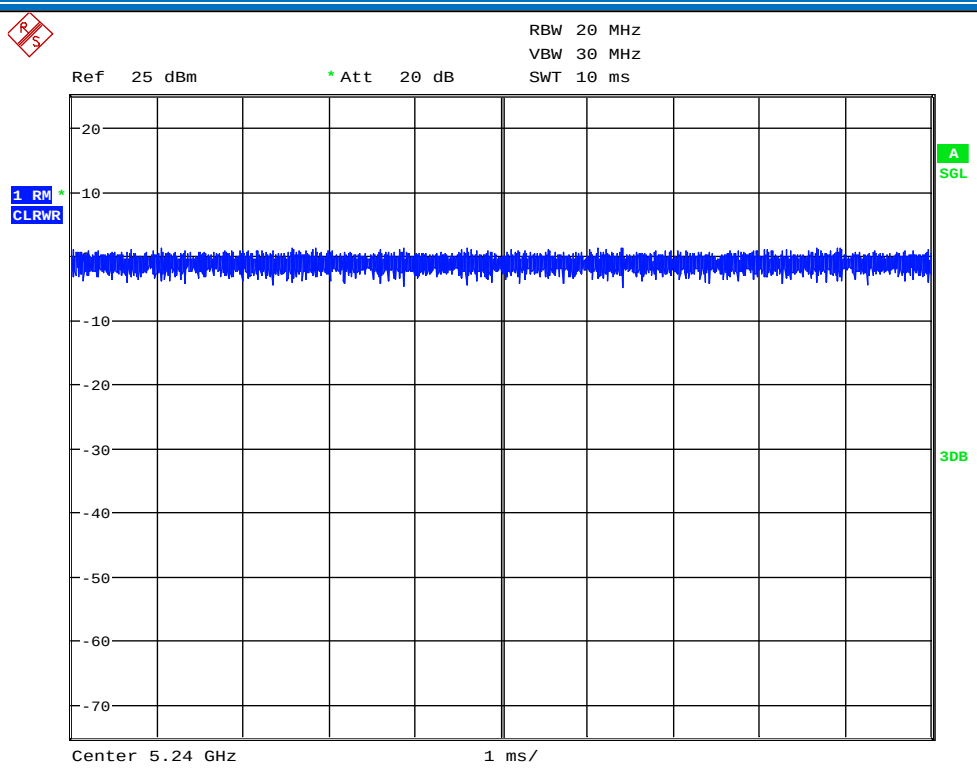
Duty Cycle_11N20_5180_Ant1



Duty Cycle_11N20_5200_Ant1



Duty Cycle_11N20_5240_Ant1



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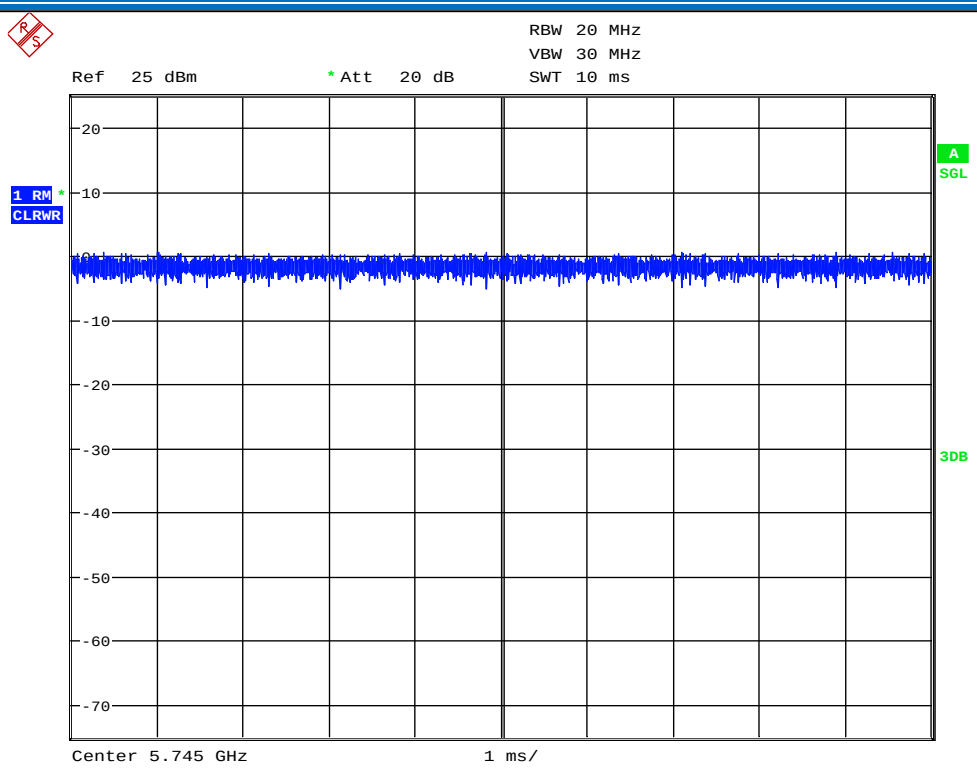
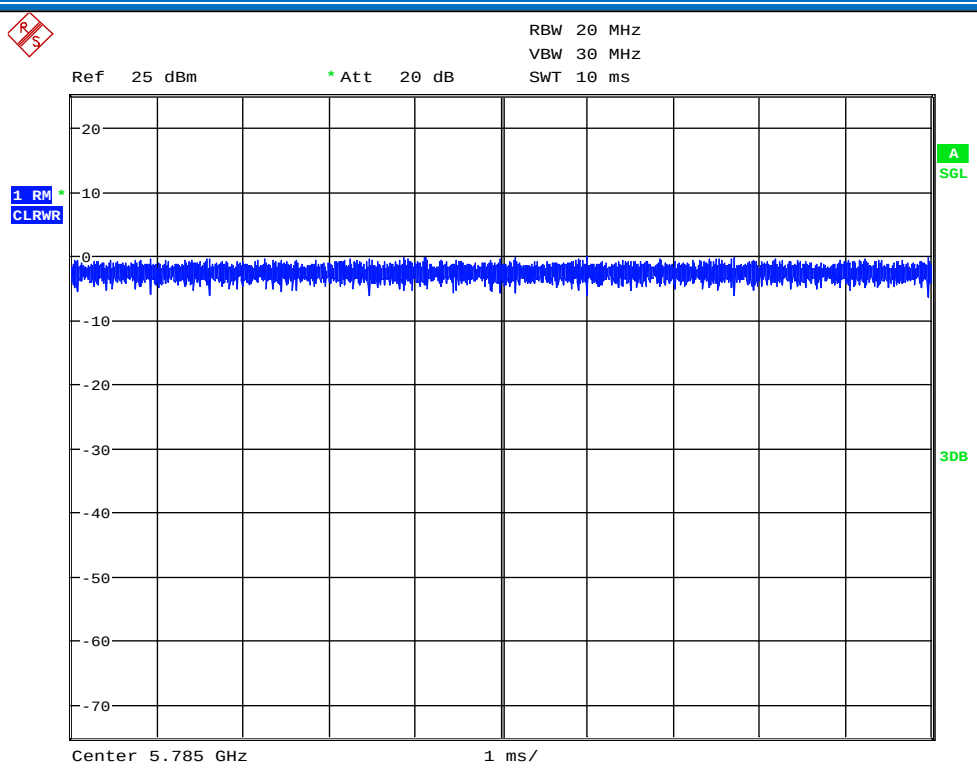
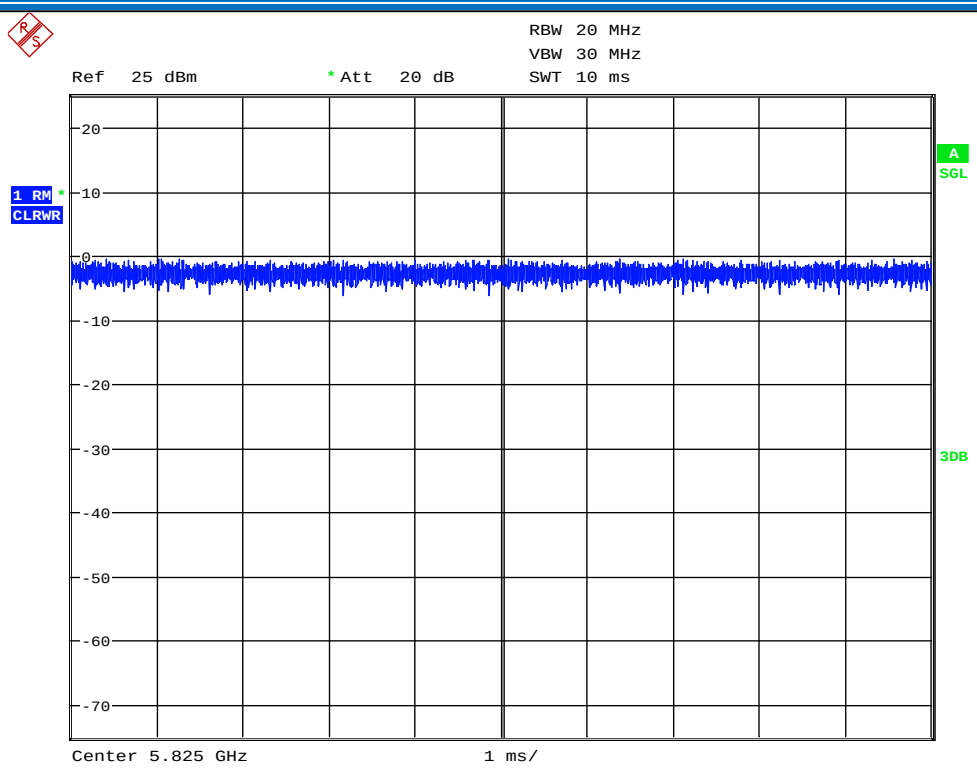


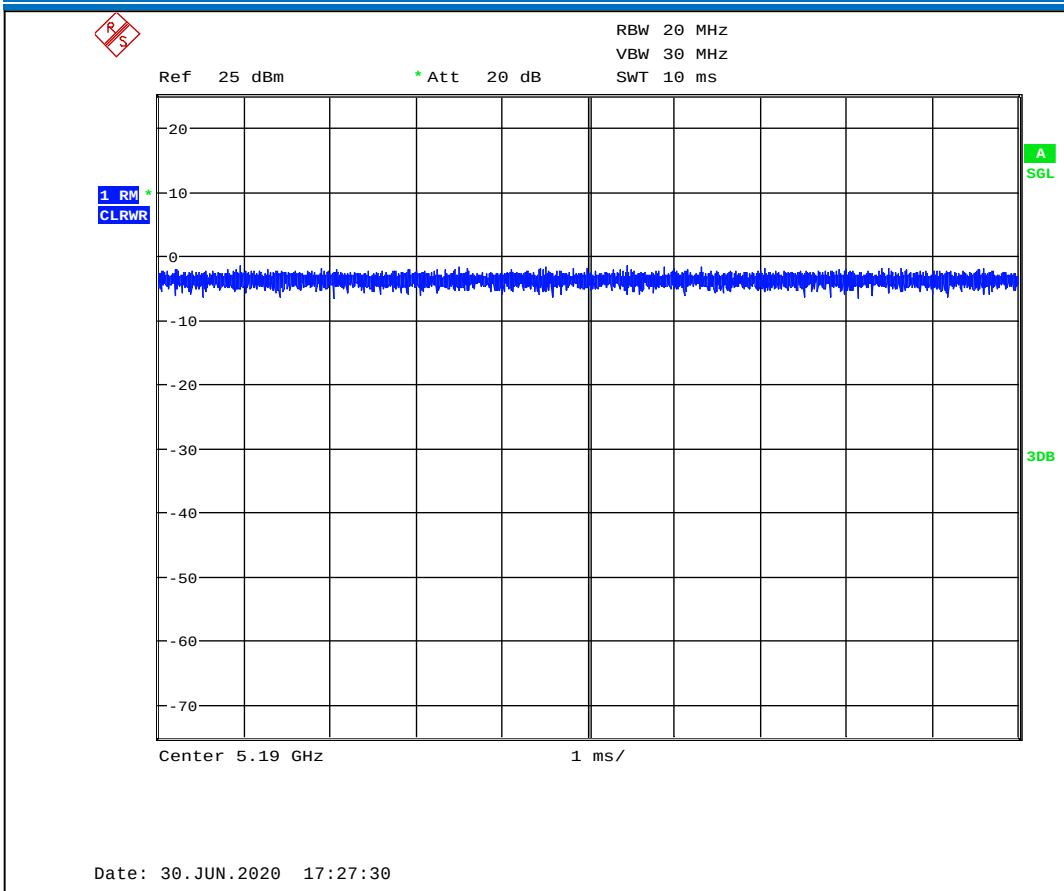
Duty Cycle_11N20_5785_Ant1



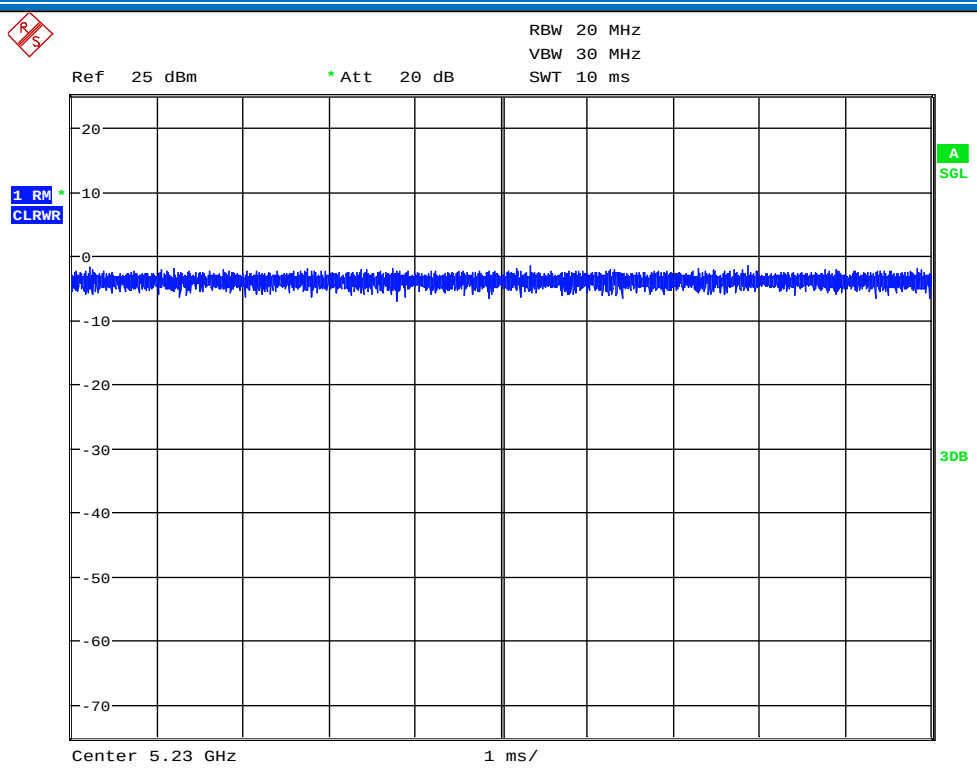
Duty Cycle_11N20_5825_Ant1



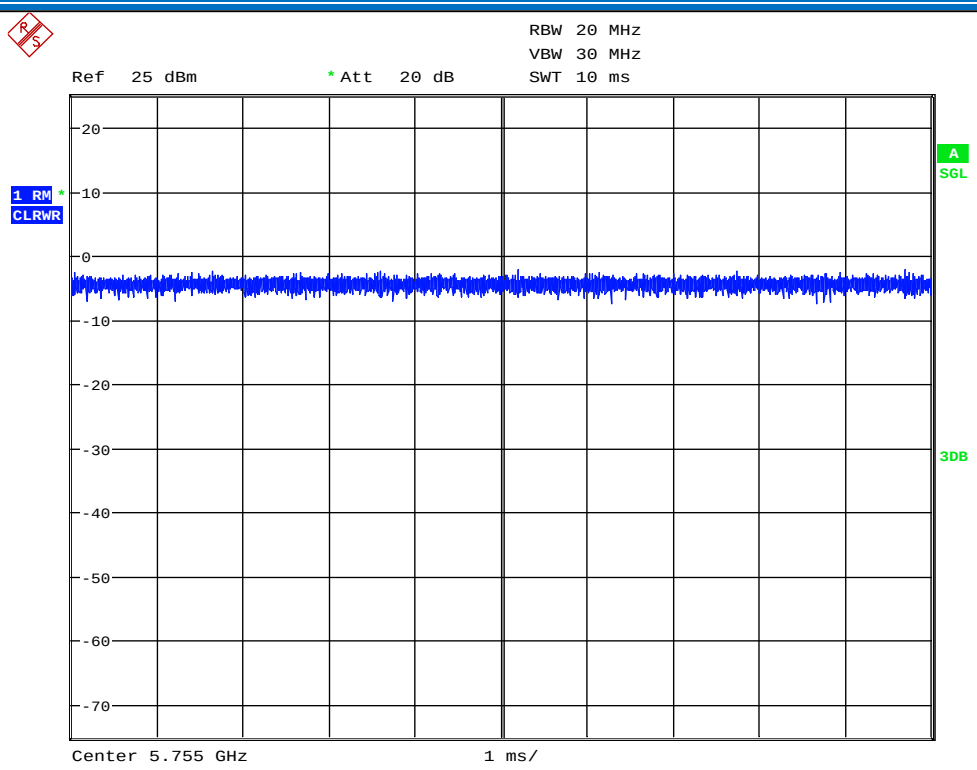
Duty Cycle_11N40_5190_Ant1



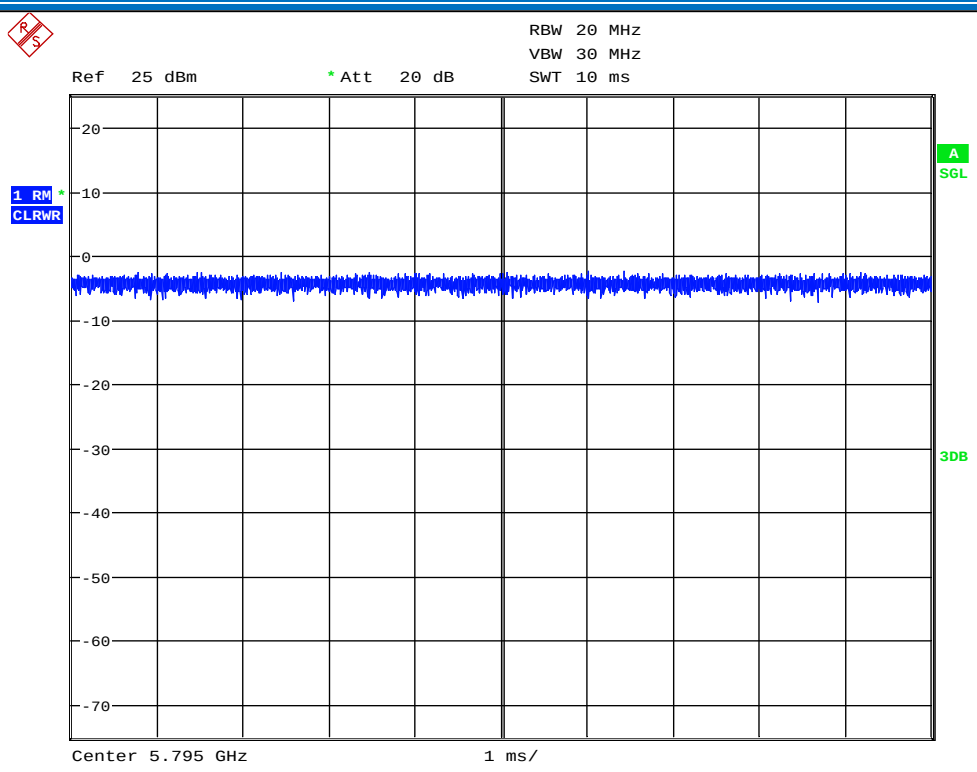
Duty Cycle_11N40_5230_Ant1



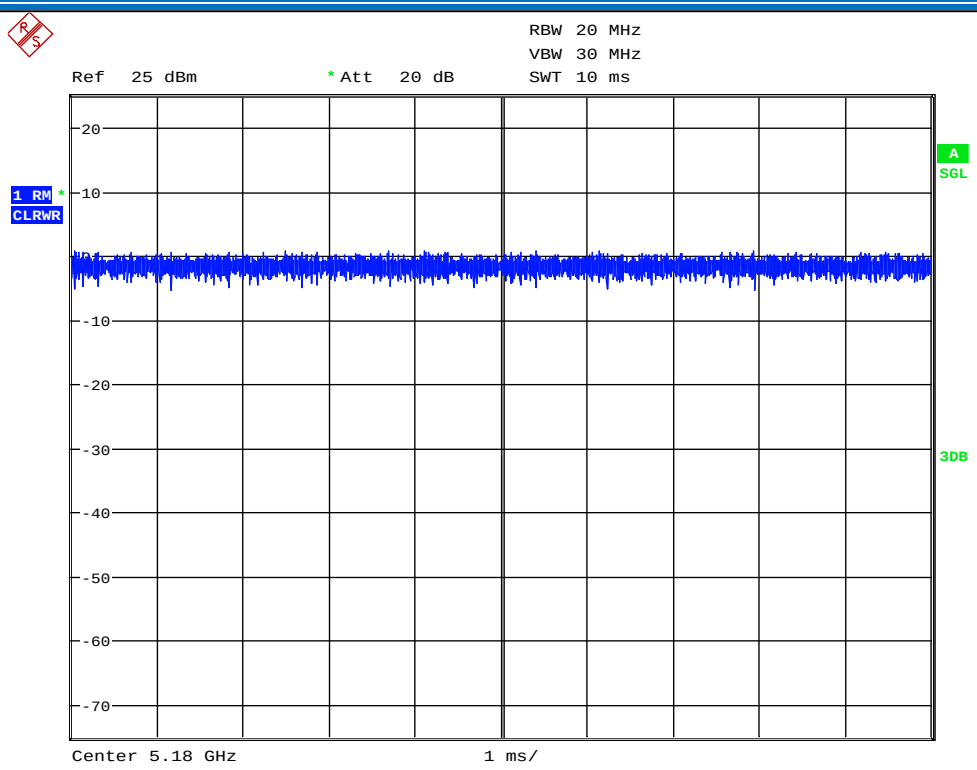
Duty Cycle_11N40_5755_Ant1



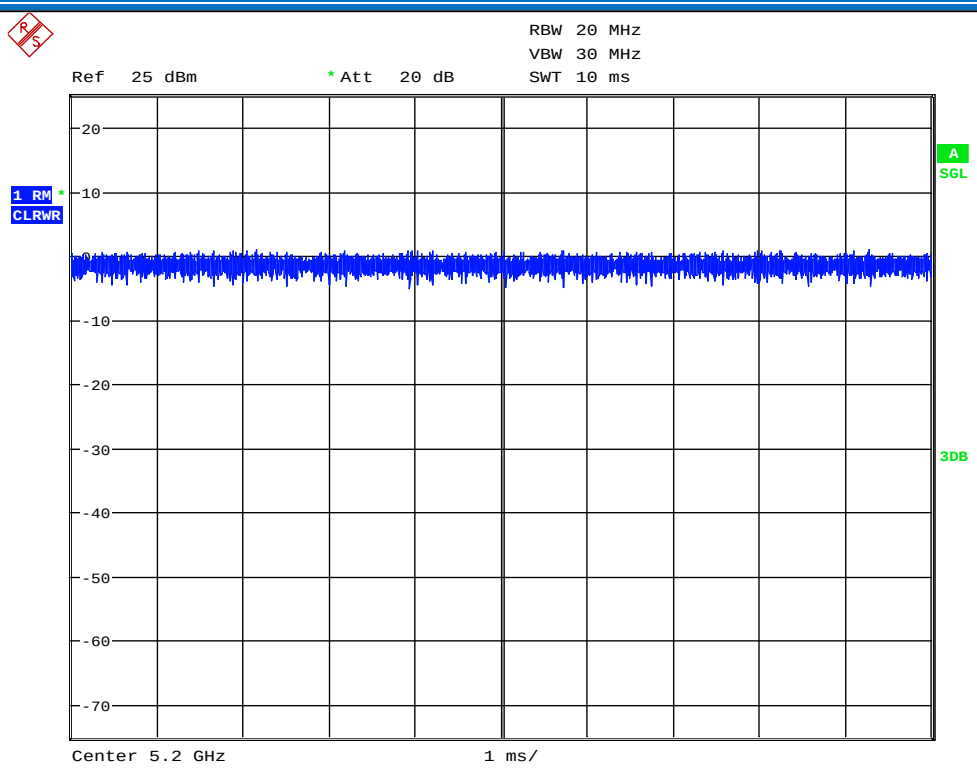
Duty Cycle_11N40_5795_Ant1



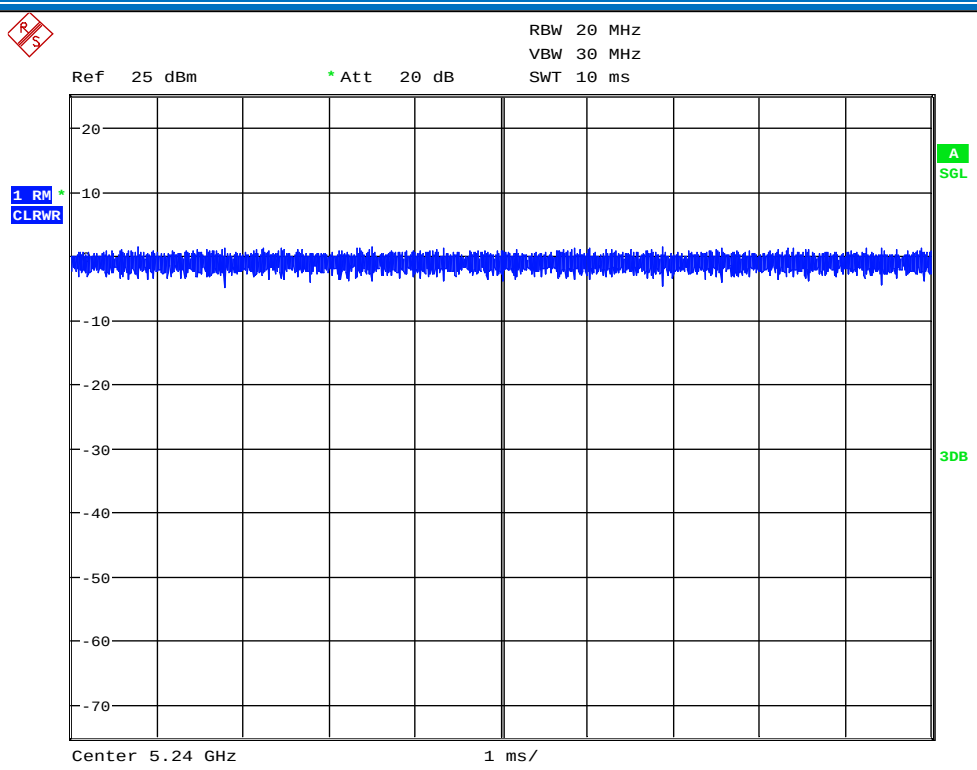
Duty Cycle_11AC20_5180_Ant1



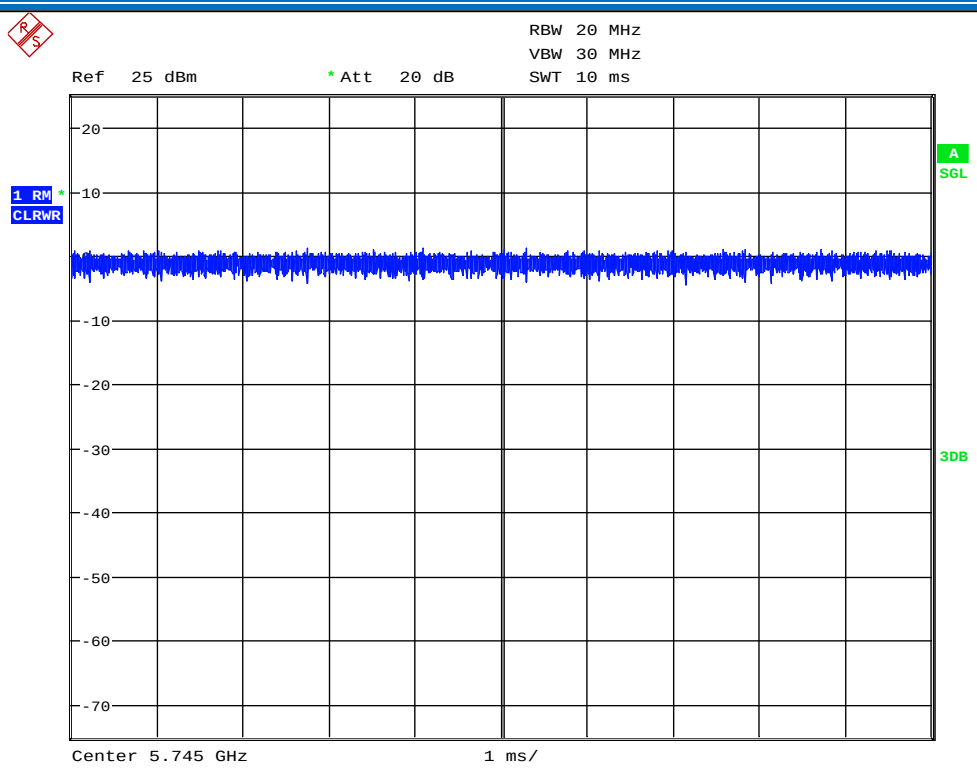
Duty Cycle_11AC20_5200_Ant1



Duty Cycle_11AC20_5240_Ant1



Duty Cycle_11AC20_5745_Ant1



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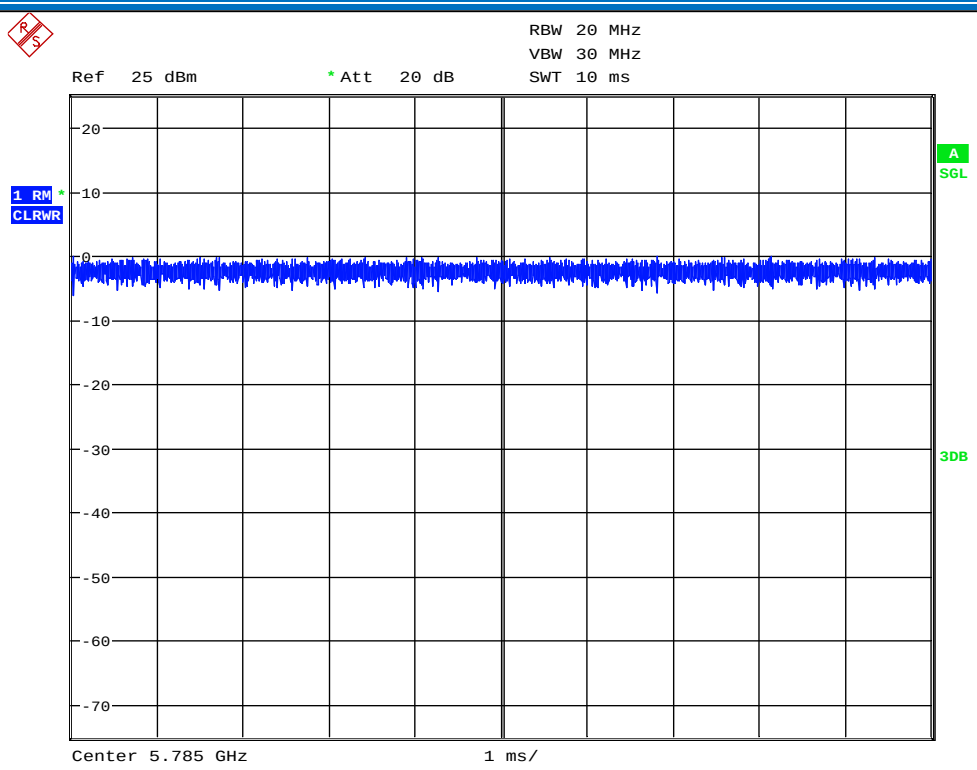
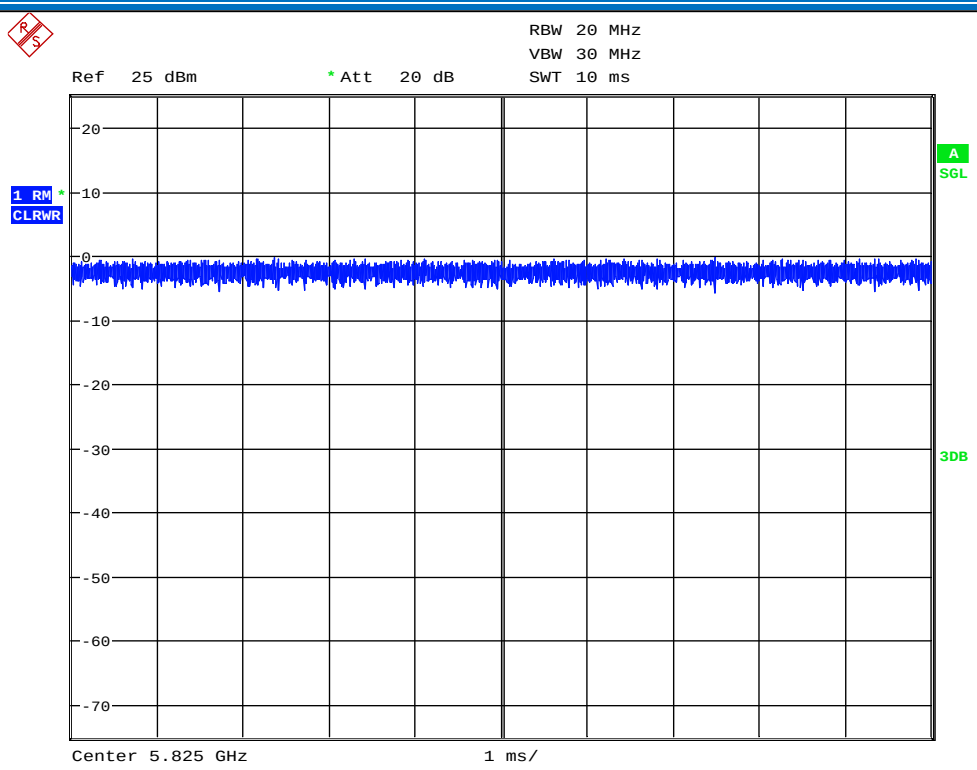
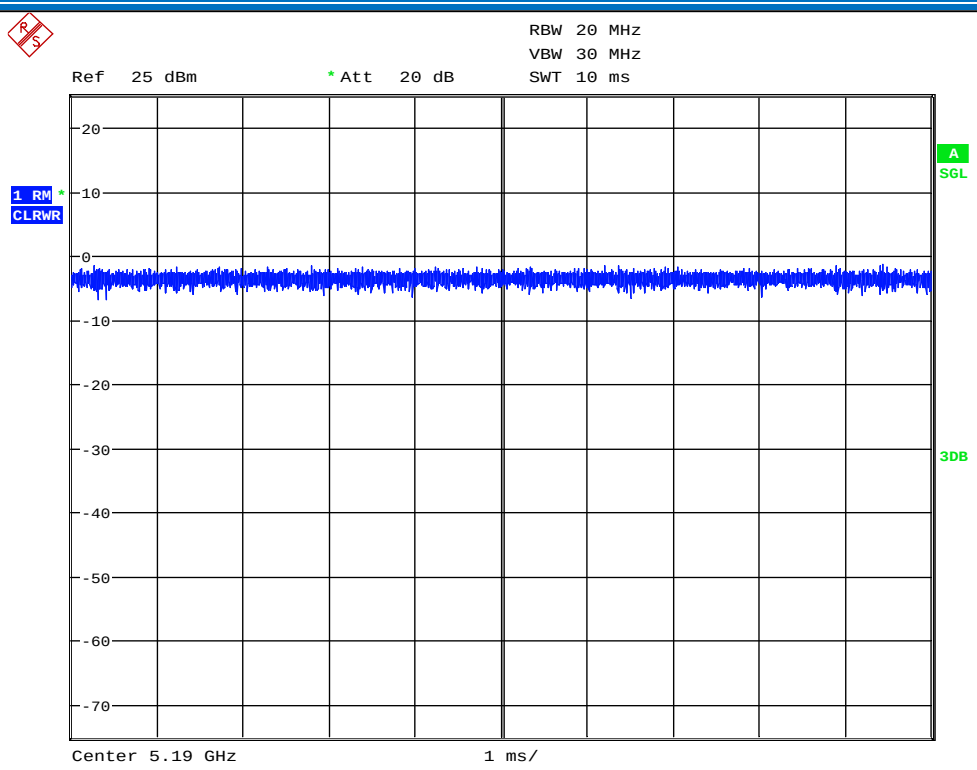


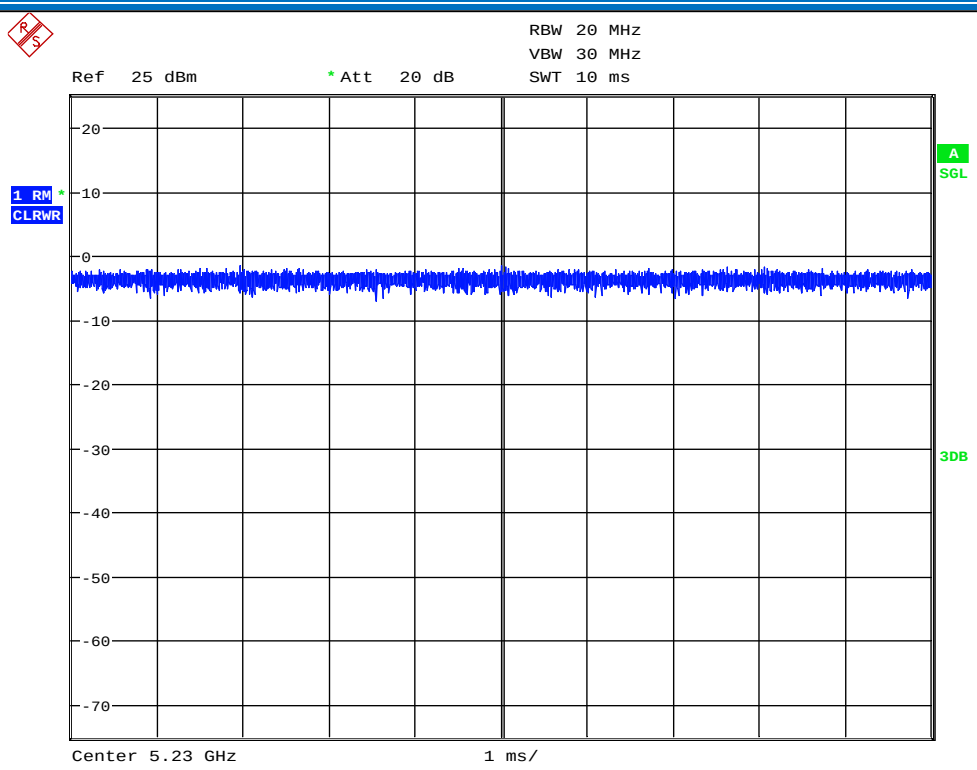
Duty Cycle_11AC20_5825_Ant1



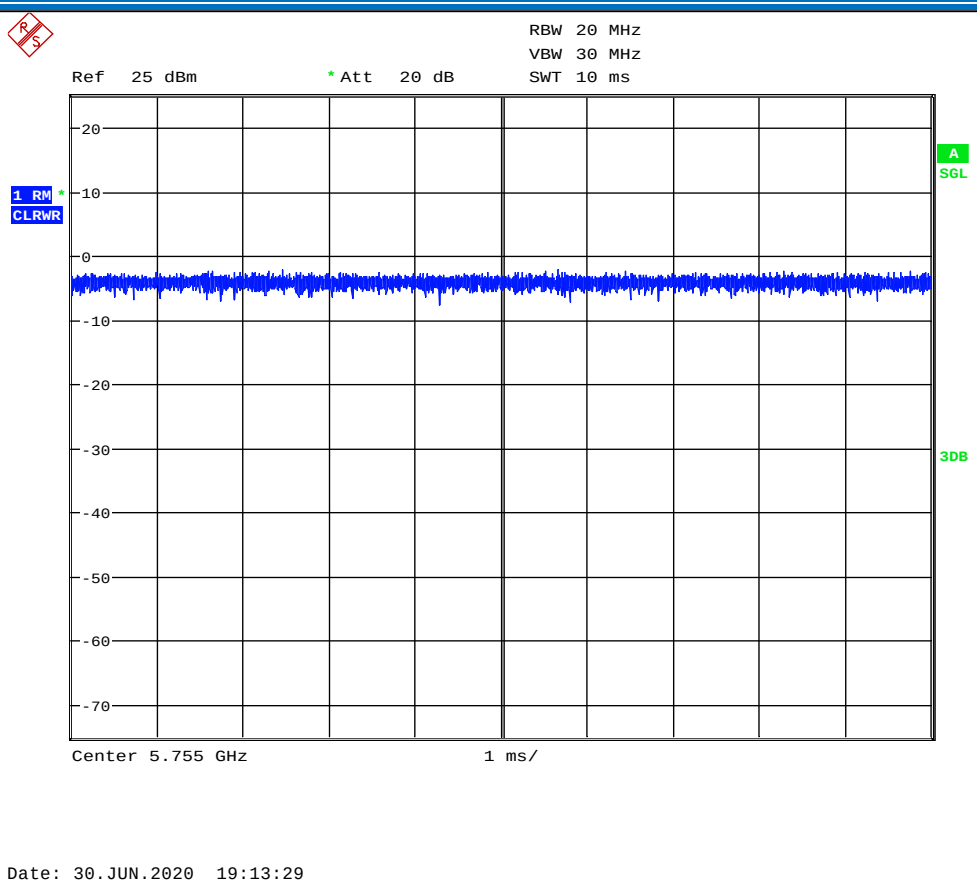
Duty Cycle_11AC40_5190_Ant1



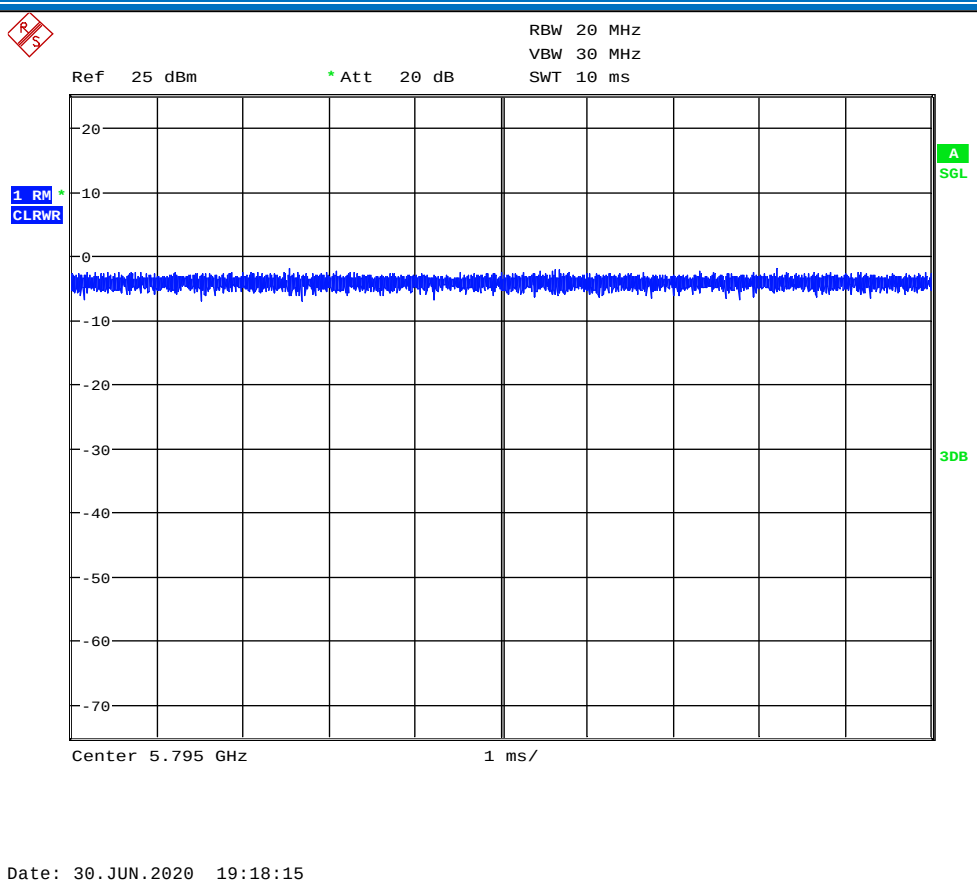
Duty Cycle_11AC40_5230_Ant1



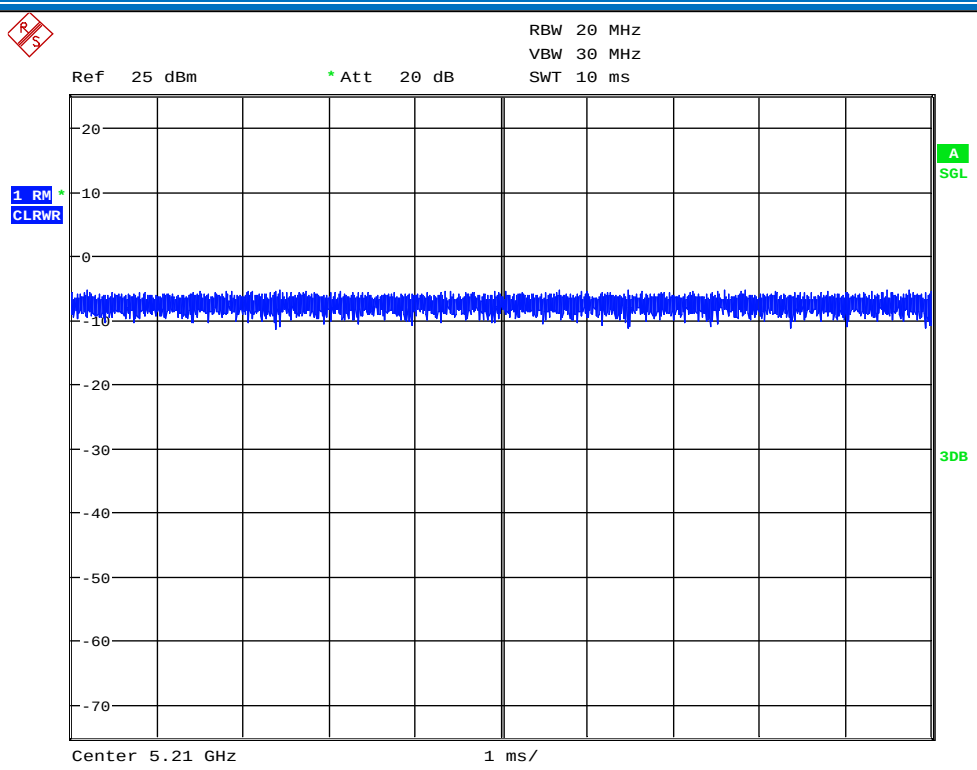
Duty Cycle_11AC40_5755_Ant1



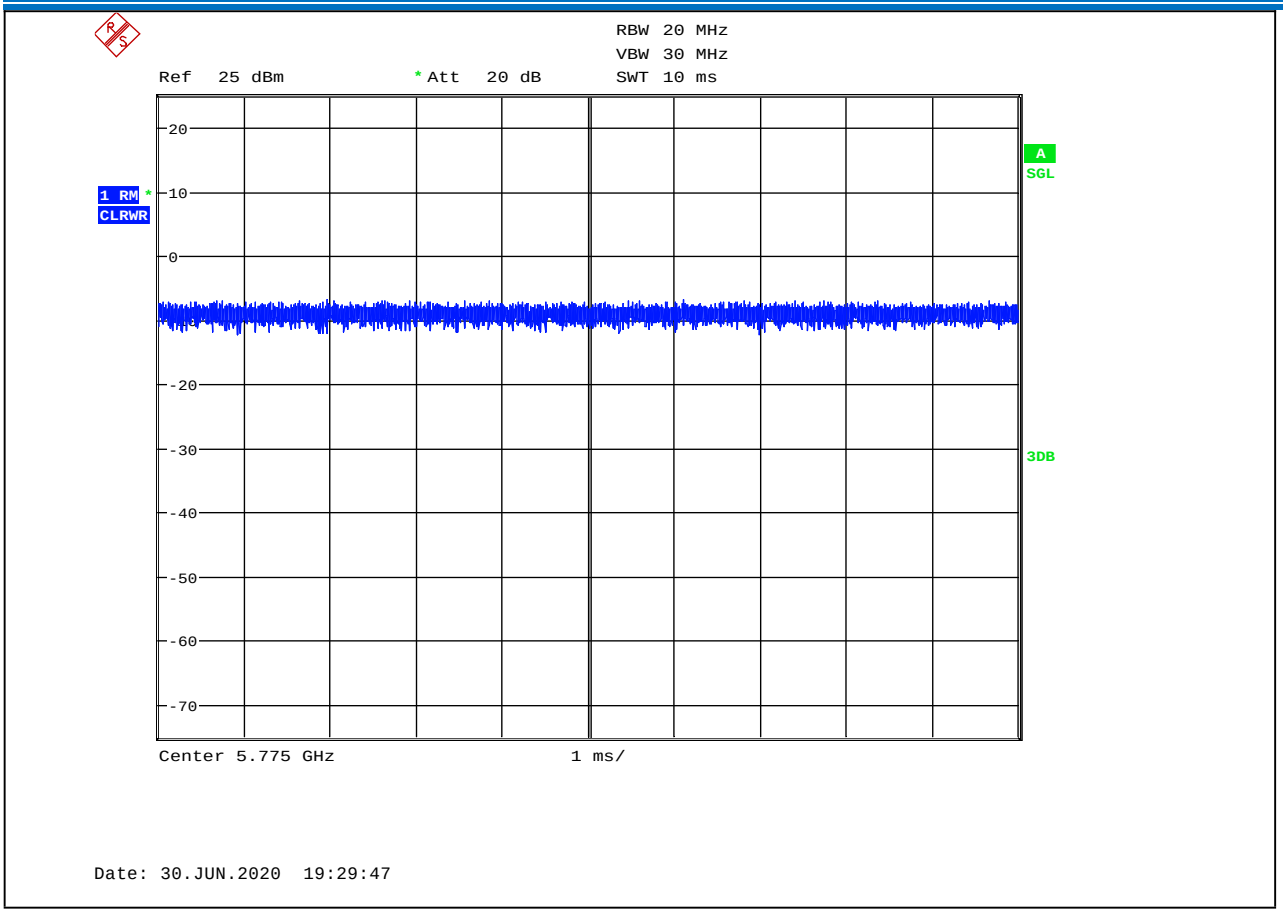
Duty Cycle_11AC40_5795_Ant1



Duty Cycle_11AC80_5210_Ant1



Duty Cycle_11AC80_5775_Ant1


RBW 20 MHz
VBW 30 MHz
Ref 25 dBm
*Att 20 dB
SWT 10 ms
1 RM
CLRWR
A
SGL
3DB
20
10
0
-20
-30
-40
-50
-60
-70
Center 5.775 GHz
1 ms/
Date: 30.JUN.2020 19:29:47

Conducted Average Output Power:

Measurement Data

Test Mode	Antenna	Channel	Meas.Level [dBm]	Av.Power [dBm]	Verdict
11A	Ant1	5180	8.7	8.7	PASS
11A	Ant1	5200	8.85	8.85	PASS
11A	Ant1	5240	9.3	9.3	PASS
11A	Ant1	5745	8.85	8.85	PASS
11A	Ant1	5785	7.85	7.85	PASS
11A	Ant1	5825	7.71	7.71	PASS
11N20	Ant1	5180	8.56	8.56	PASS
11N20	Ant1	5200	8.79	8.79	PASS
11N20	Ant1	5240	9.22	9.22	PASS
11N20	Ant1	5745	8.71	8.71	PASS
11N20	Ant1	5785	7.8	7.8	PASS
11N20	Ant1	5825	7.68	7.68	PASS
11N40	Ant1	5190	8.76	8.76	PASS
11N40	Ant1	5230	8.76	8.76	PASS
11N40	Ant1	5755	8.42	8.42	PASS
11N40	Ant1	5795	8.37	8.37	PASS
11AC20	Ant1	5180	8.66	8.66	PASS
11AC20	Ant1	5200	8.96	8.96	PASS
11AC20	Ant1	5240	9.27	9.27	PASS
11AC20	Ant1	5745	9.19	9.19	PASS
11AC20	Ant1	5785	7.85	7.85	PASS
11AC20	Ant1	5825	7.79	7.79	PASS
11AC40	Ant1	5190	8.96	8.96	PASS
11AC40	Ant1	5230	8.94	8.94	PASS
11AC40	Ant1	5755	8.53	8.53	PASS
11AC40	Ant1	5795	8.52	8.52	PASS
11AC80	Ant1	5210	8.92	8.92	PASS
11AC80	Ant1	5775	8.41	8.41	PASS

Remark:
Av.Power=Meas.Level+10 log (1/duty cycle)
E.i.r.p=Av.Power+G,
G = antenna gain in dBi.

Appendix C): Power Spectral Density

Result Table

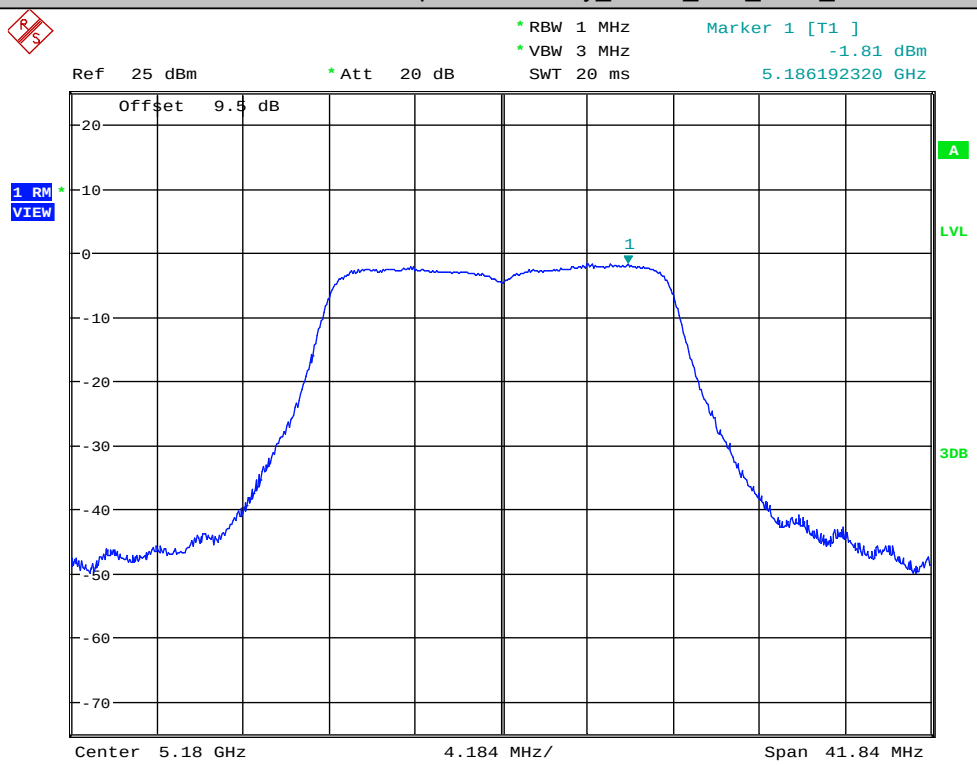
Test Mode	Antenna	Channel	Meas.Level [dBm]	Duty Cycle Factor [dB]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	Ant1	5180	-1.81	0	-1.81	11.00	PASS
11A	Ant1	5200	-1.82	0	-1.82	11.00	PASS
11A	Ant1	5240	-1.37	0	-1.37	11.00	PASS
11N20	Ant1	5180	-2.12	0	-2.12	11.00	PASS
11N20	Ant1	5200	-2.00	0	-2.00	11.00	PASS
11N20	Ant1	5240	-1.65	0	-1.65	11.00	PASS
11N40	Ant1	5190	-5.07	0	-5.07	11.00	PASS
11N40	Ant1	5230	-4.49	0	-4.49	11.00	PASS
11AC20	Ant1	5180	-1.98	0	-1.98	11.00	PASS
11AC20	Ant1	5200	-1.91	0	-1.91	11.00	PASS
11AC20	Ant1	5240	-1.39	0	-1.39	11.00	PASS
11AC40	Ant1	5190	-4.84	0	-4.84	11.00	PASS
11AC40	Ant1	5230	-4.30	0	-4.30	11.00	PASS
11AC80	Ant1	5210	-6.85	0	-6.85	11.00	PASS
Test Mode	Antenna	Channel	Meas.Level [dBm]	Duty Cycle Factor [dB]	PSD [dBm/MHz]	Limit [dBm/500kHz]	Verdict
11A	Ant1	5180	-3.77	0	-3.77	30.00	PASS
11A	Ant1	5200	-4.34	0	-4.34	30.00	PASS
11A	Ant1	5240	-5.11	0	-5.11	30.00	PASS
11N20	Ant1	5180	-4.59	0	-4.59	30.00	PASS
11N20	Ant1	5200	-5.02	0	-5.02	30.00	PASS
11N20	Ant1	5240	-5.40	0	-5.40	30.00	PASS
11N40	Ant1	5190	-7.06	0	-7.06	30.00	PASS
11N40	Ant1	5230	-7.39	0	-7.39	30.00	PASS
11AC20	Ant1	5180	-4.08	0	-4.08	30.00	PASS
11AC20	Ant1	5200	-4.80	0	-4.80	30.00	PASS
11AC20	Ant1	5240	-5.27	0	-5.27	30.00	PASS
11AC40	Ant1	5190	-7.43	0	-7.43	30.00	PASS

11AC40	Ant1	5230	-7.28	0	-7.28	30.00	PASS
11AC80	Ant1	5210	-9.58	0	-9.58	30.00	PASS

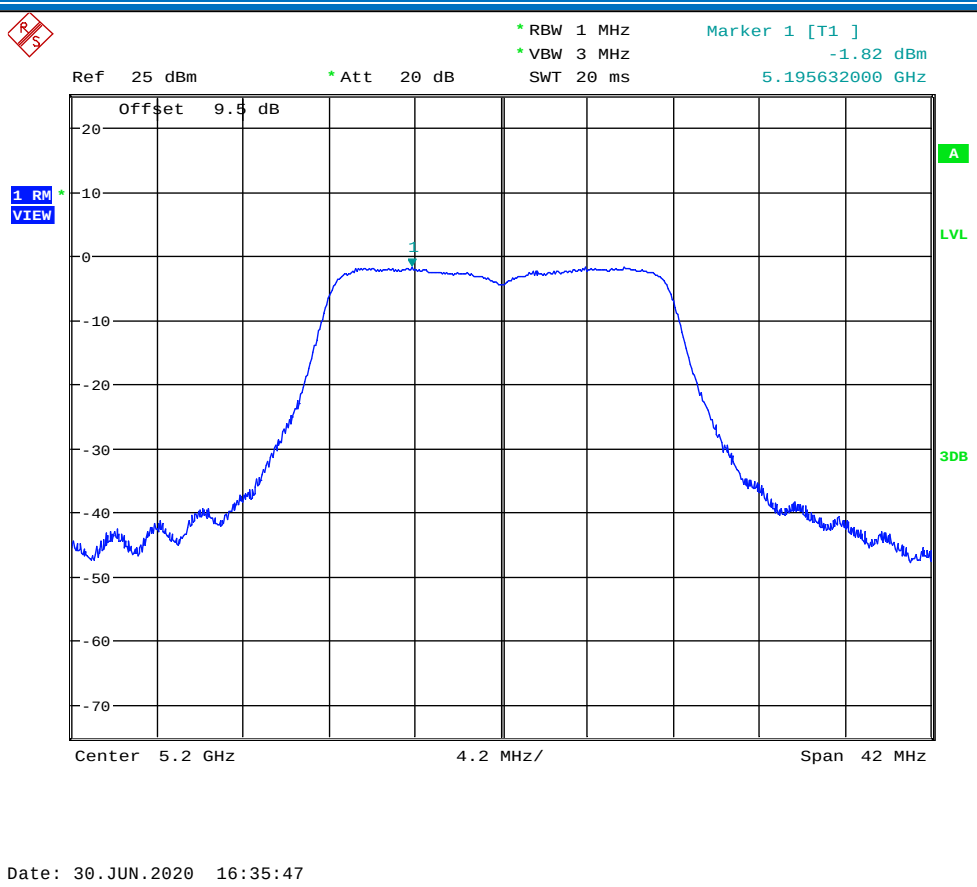
Remark:

PSD = Meas PSD + Duty Cycle Factor

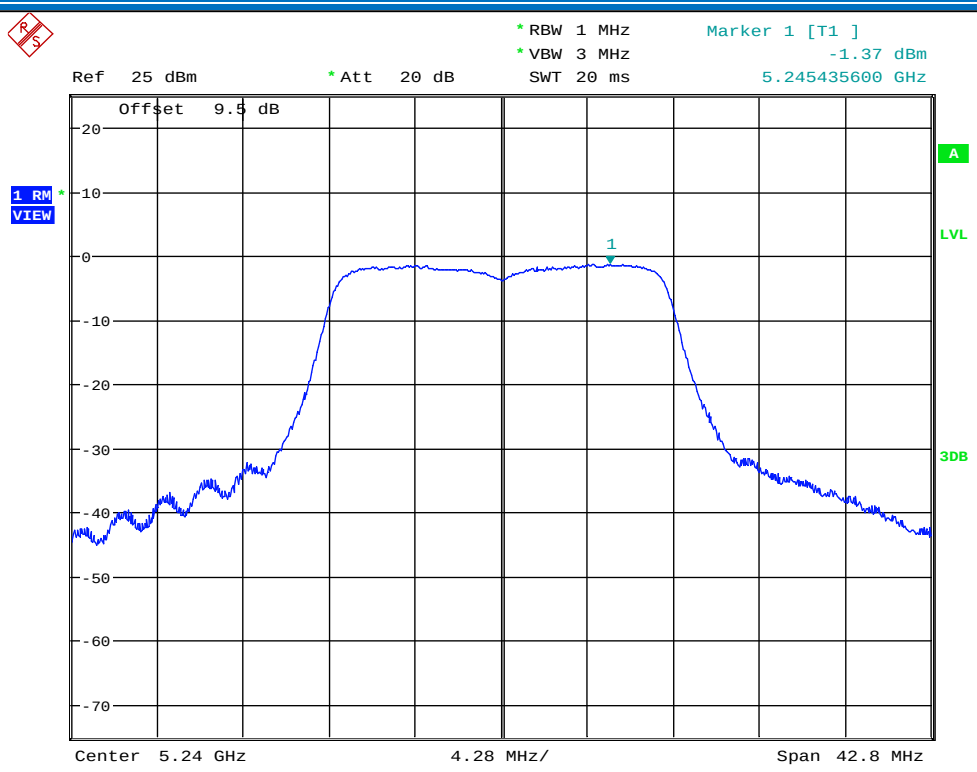
Maximum Power Spectral Density_TNVN_11A_5180_Ant1



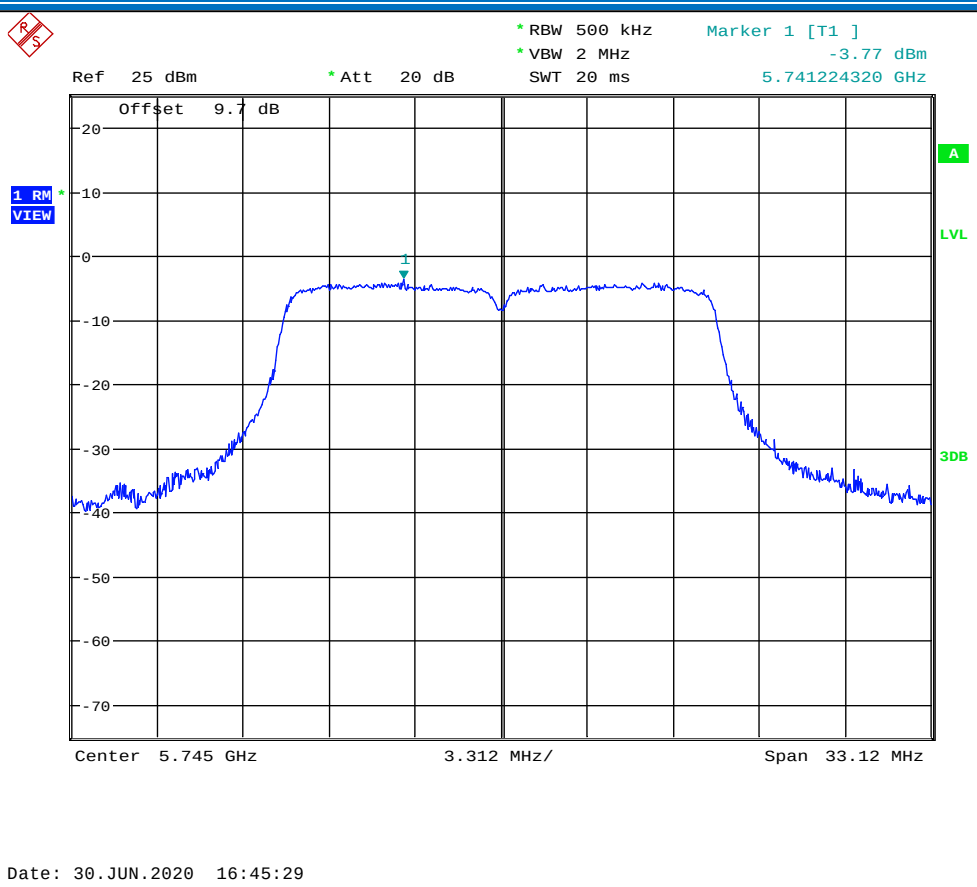
Maximum Power Spectral Density_TNVN_11A_5200_Ant1



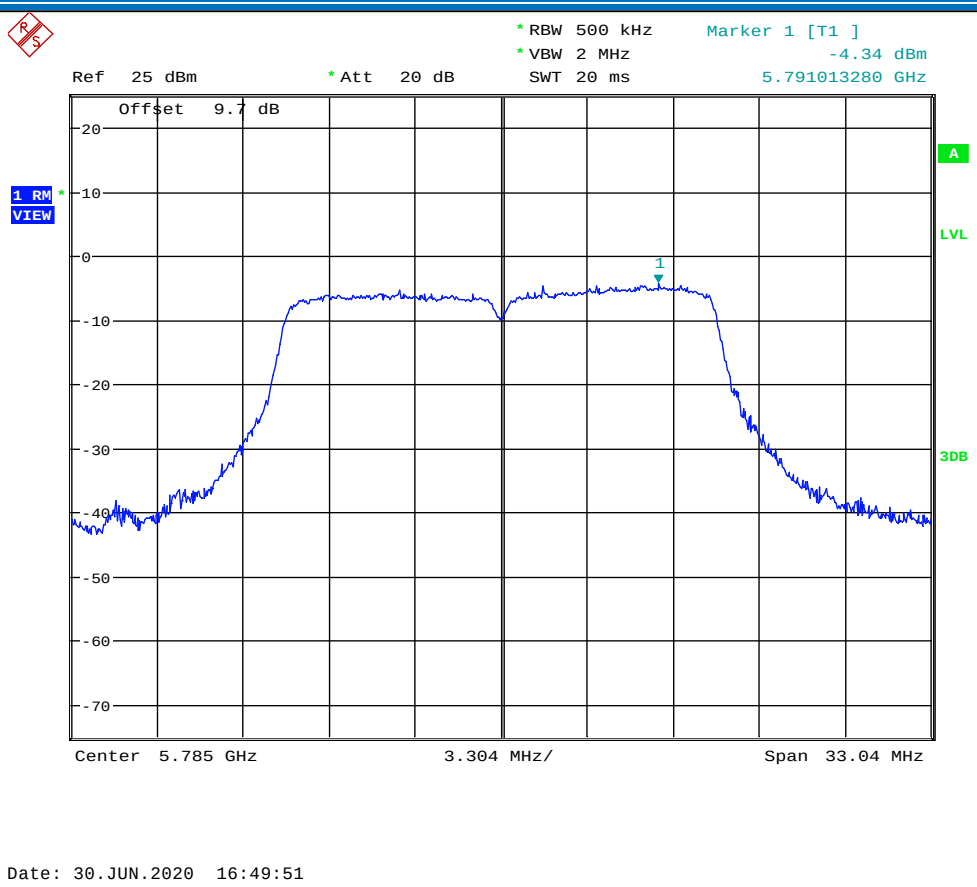
Maximum Power Spectral Density_TNVN_11A_5240_Ant1



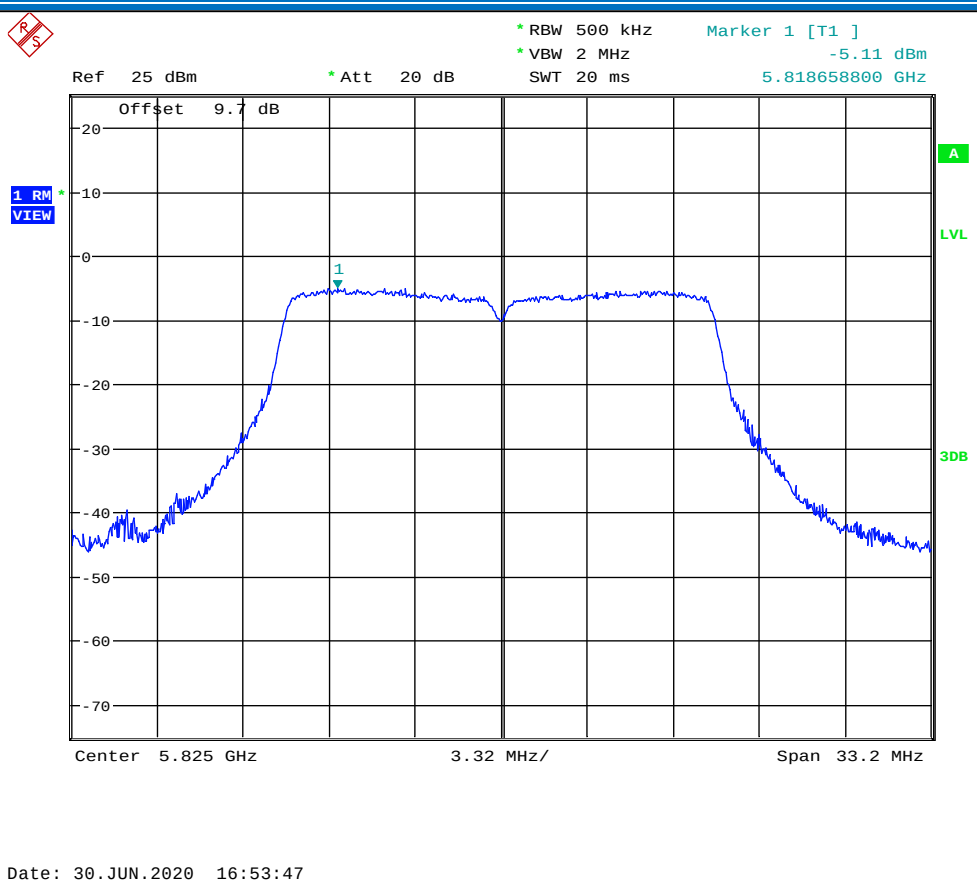
Maximum Power Spectral Density_TNVN_11A_5745_Ant1



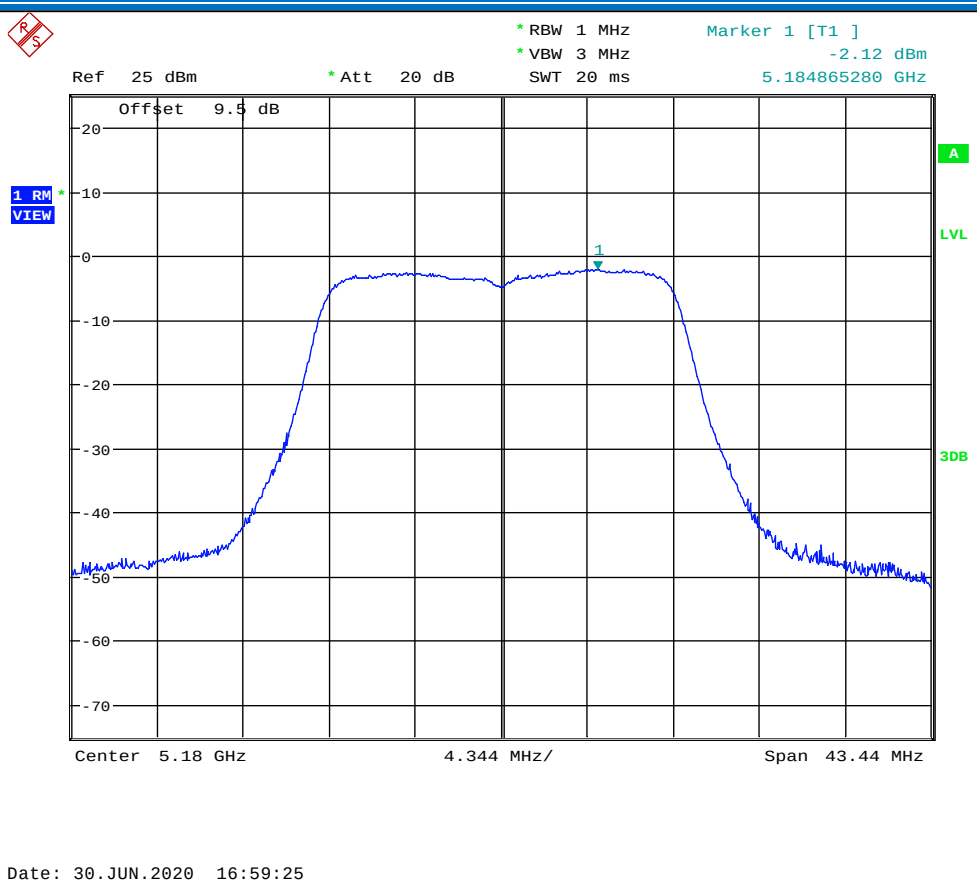
Maximum Power Spectral Density_TNVN_11A_5785_Ant1



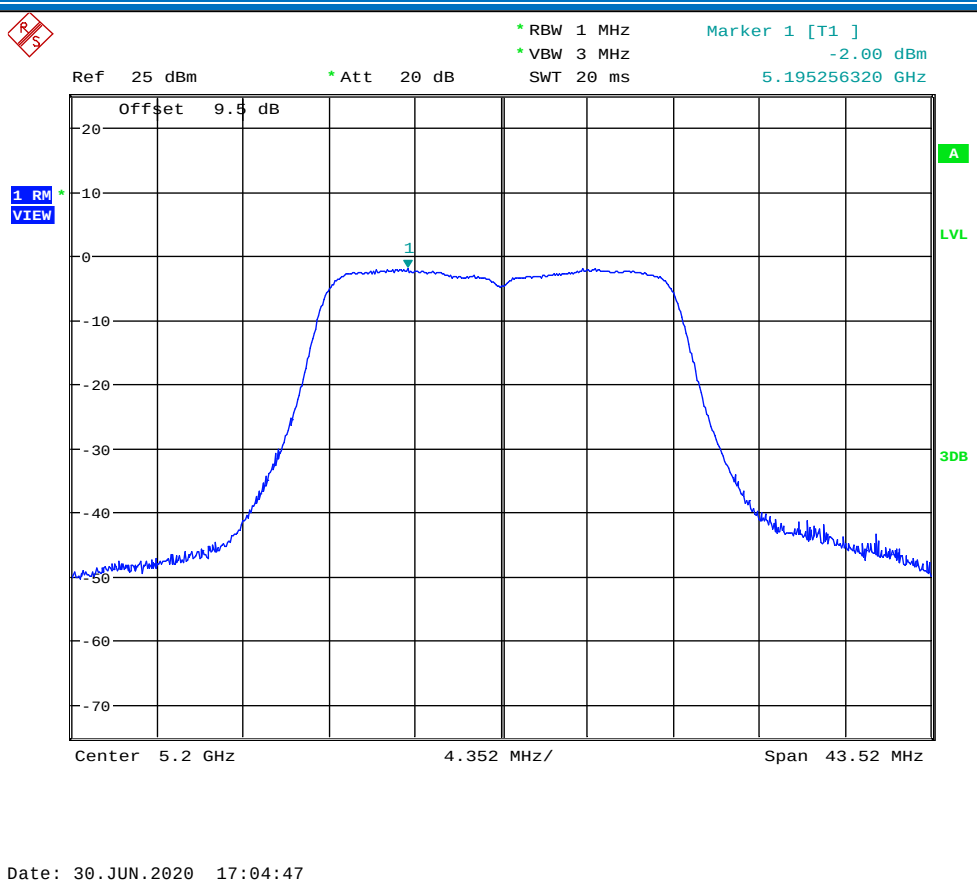
Maximum Power Spectral Density_TNVN_11A_5825_Ant1



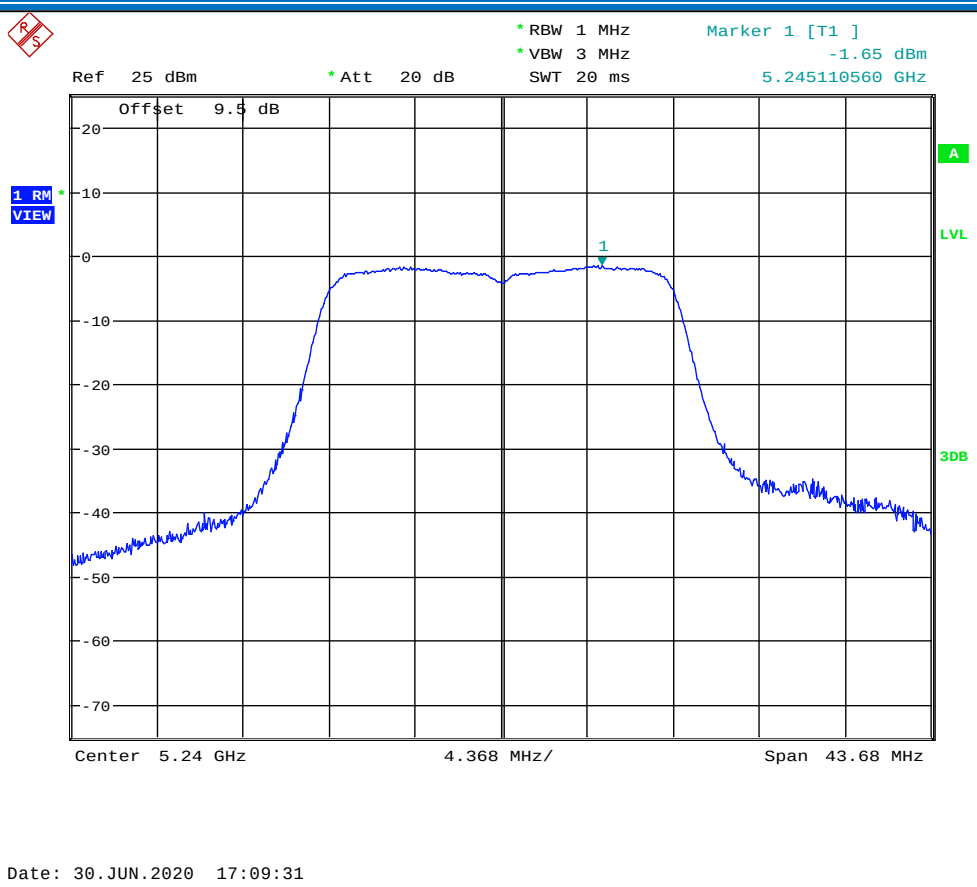
Maximum Power Spectral Density_TNVN_11N20_5180_Ant1



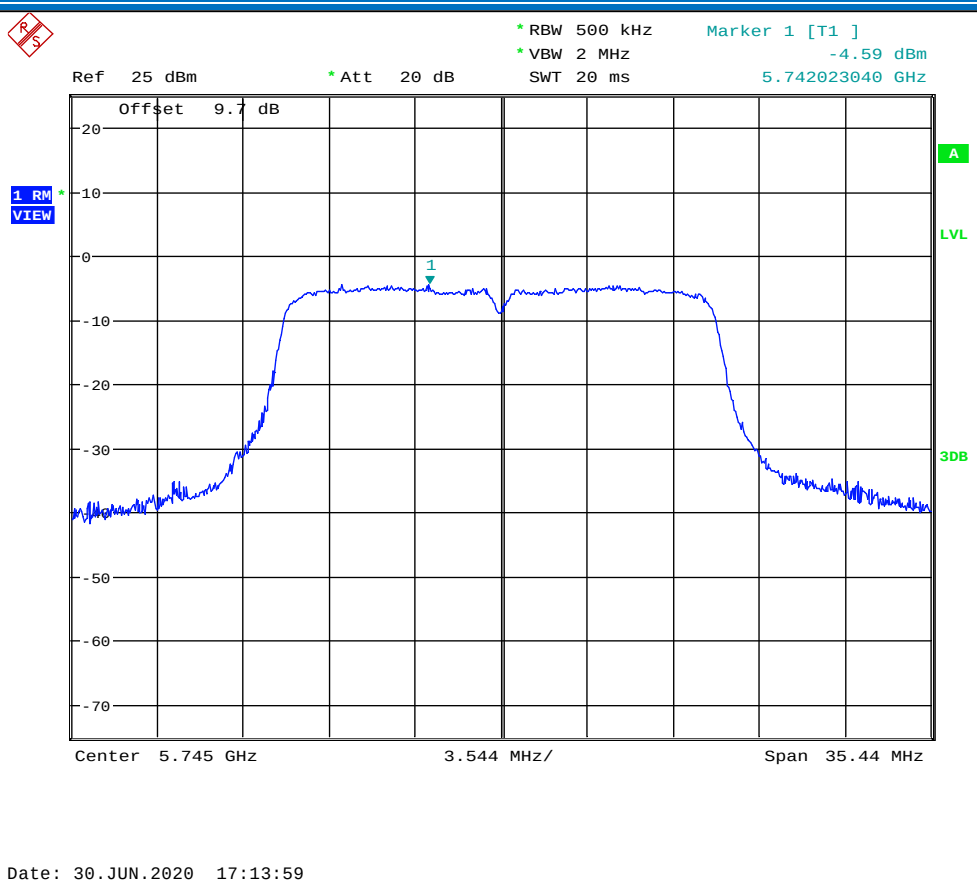
Maximum Power Spectral Density_TNVN_11N20_5200_Ant1



Maximum Power Spectral Density_TNVN_11N20_5240_Ant1



Maximum Power Spectral Density_TNVN_11N20_5745_Ant1



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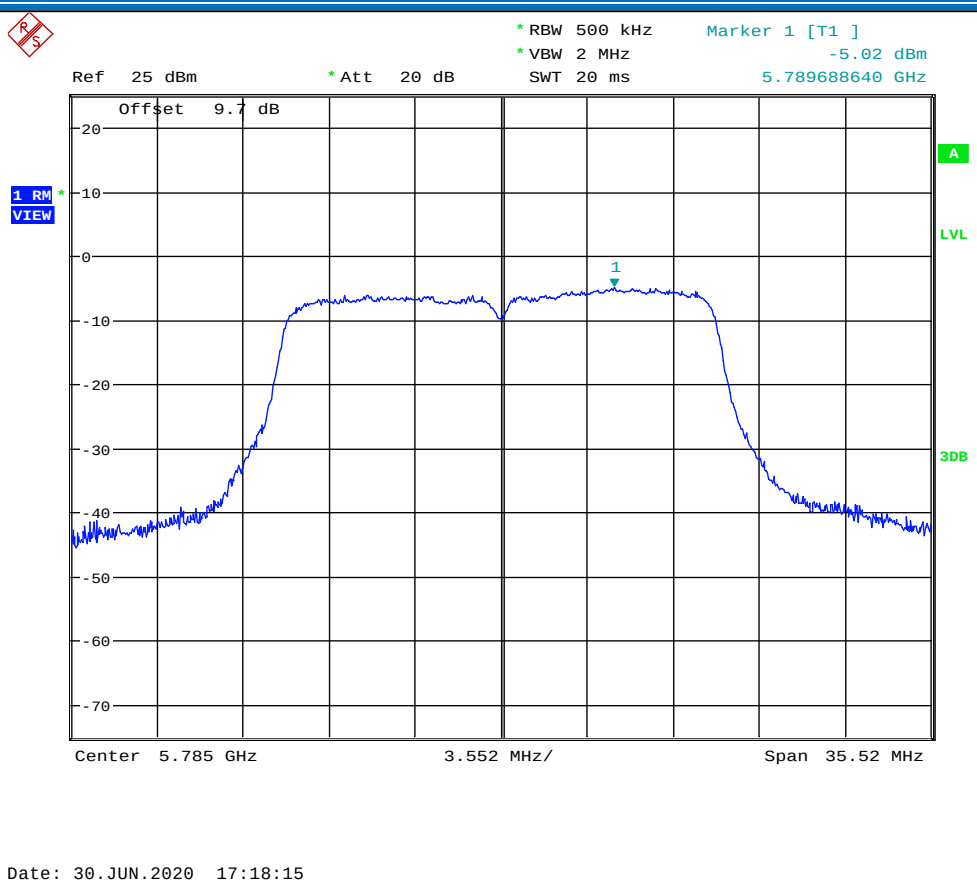

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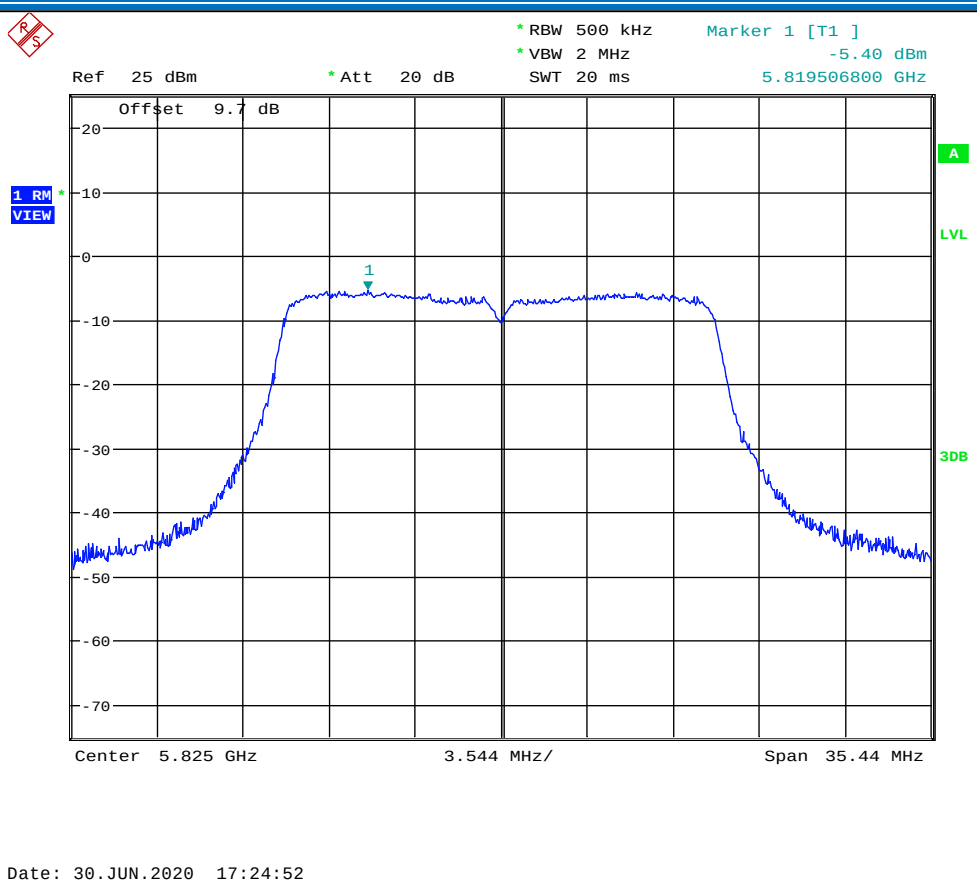
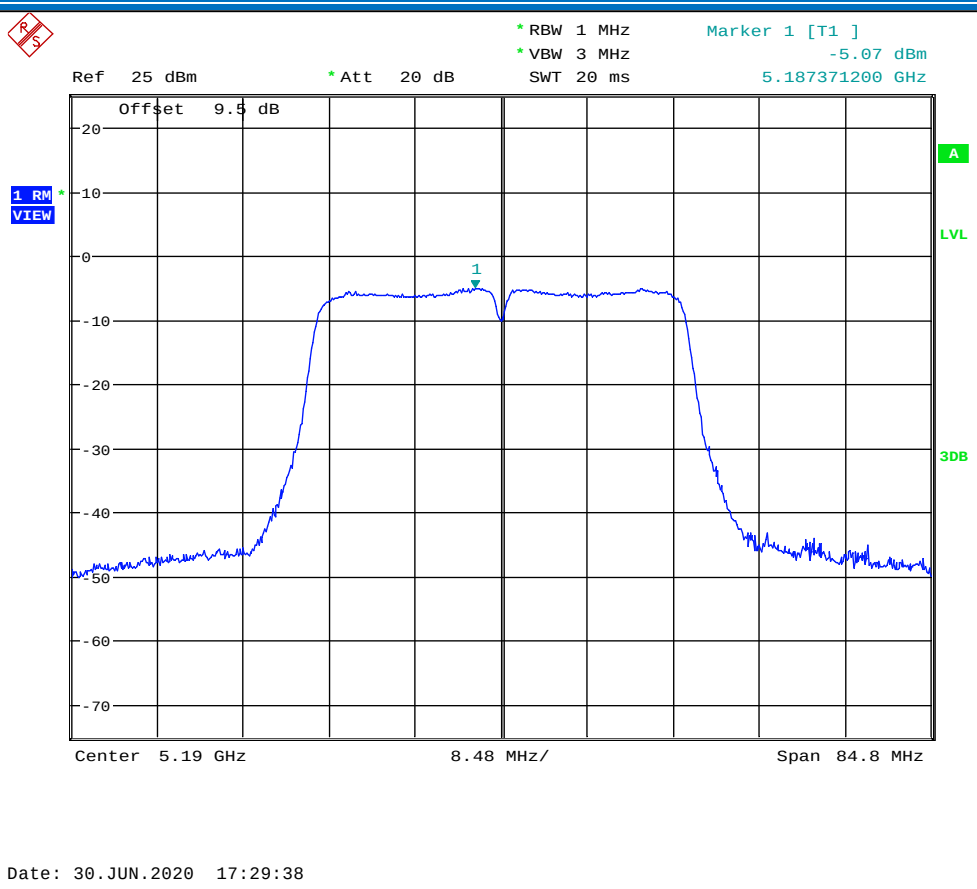
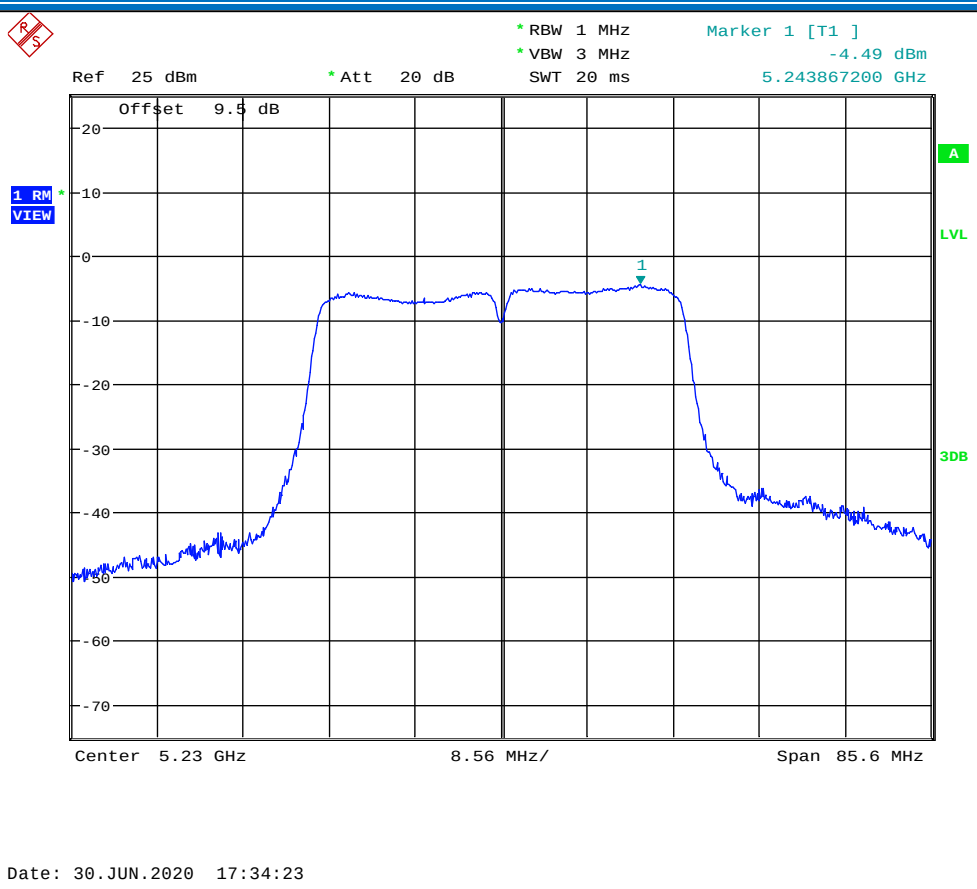


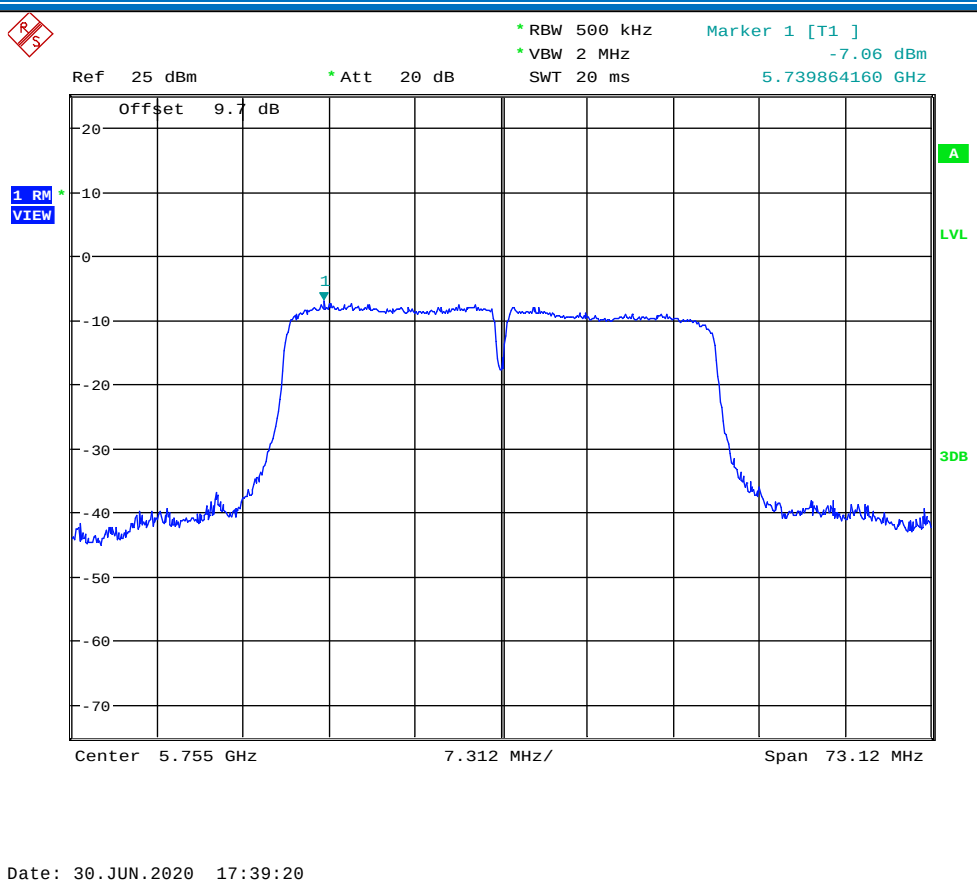
Maximum Power Spectral Density_TNVN_11N40_5190_Ant1



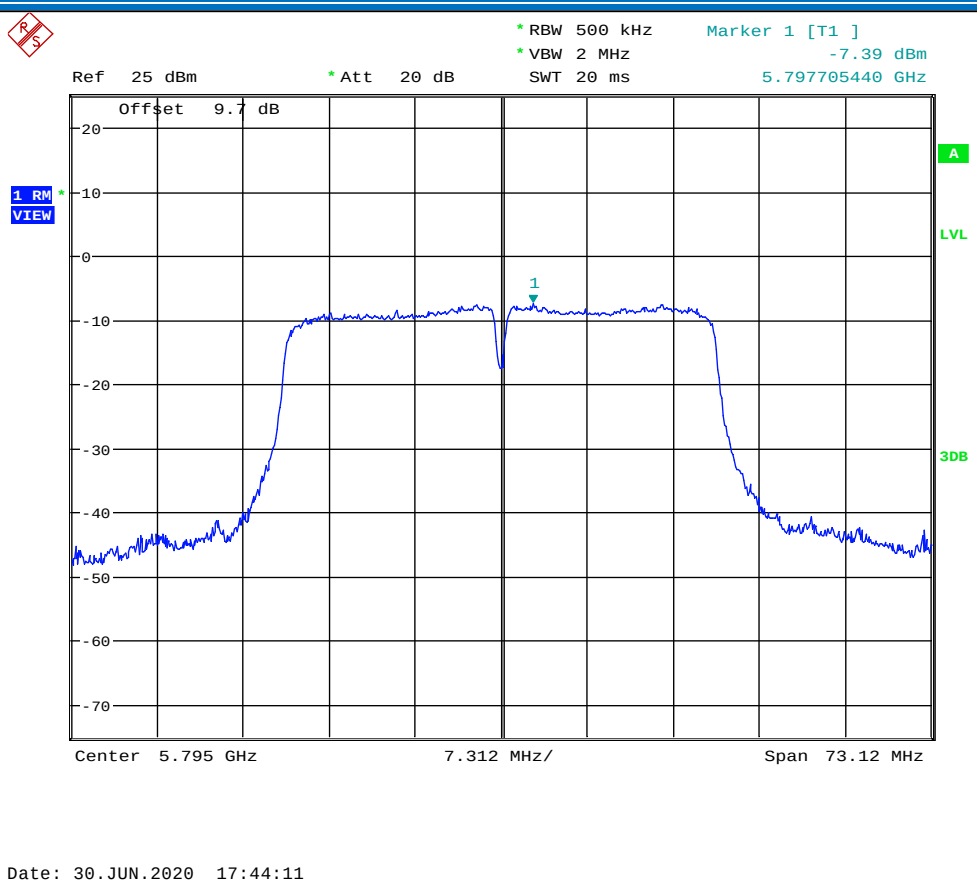
Maximum Power Spectral Density_TNVN_11N40_5230_Ant1



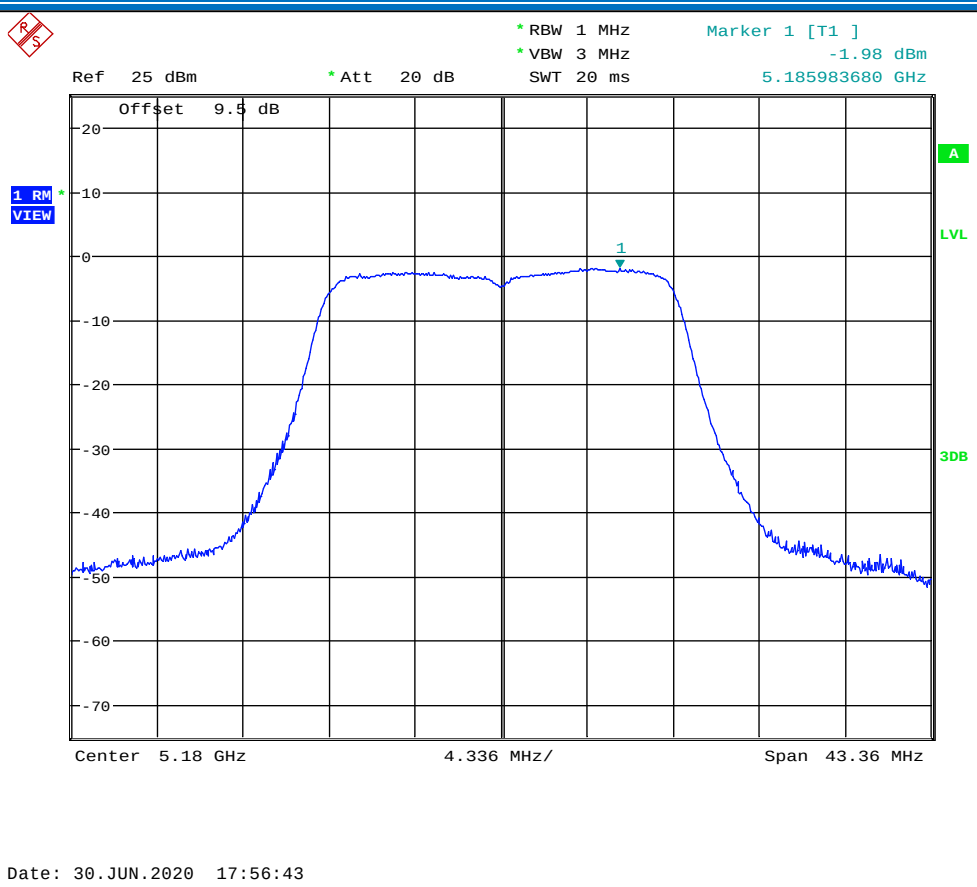
Maximum Power Spectral Density_TNVN_11N40_5755_Ant1



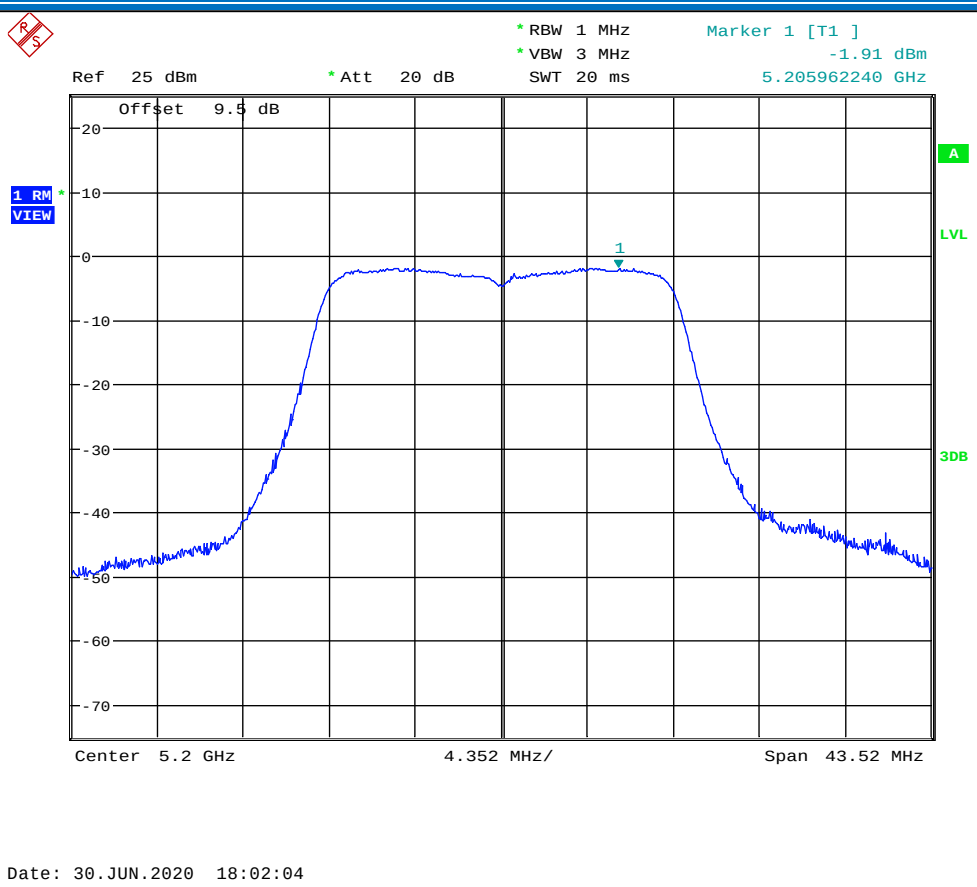
Maximum Power Spectral Density_TNVN_11N40_5795_Ant1



Maximum Power Spectral Density_TNVN_11AC20_5180_Ant1



Maximum Power Spectral Density_TNVN_11AC20_5200_Ant1



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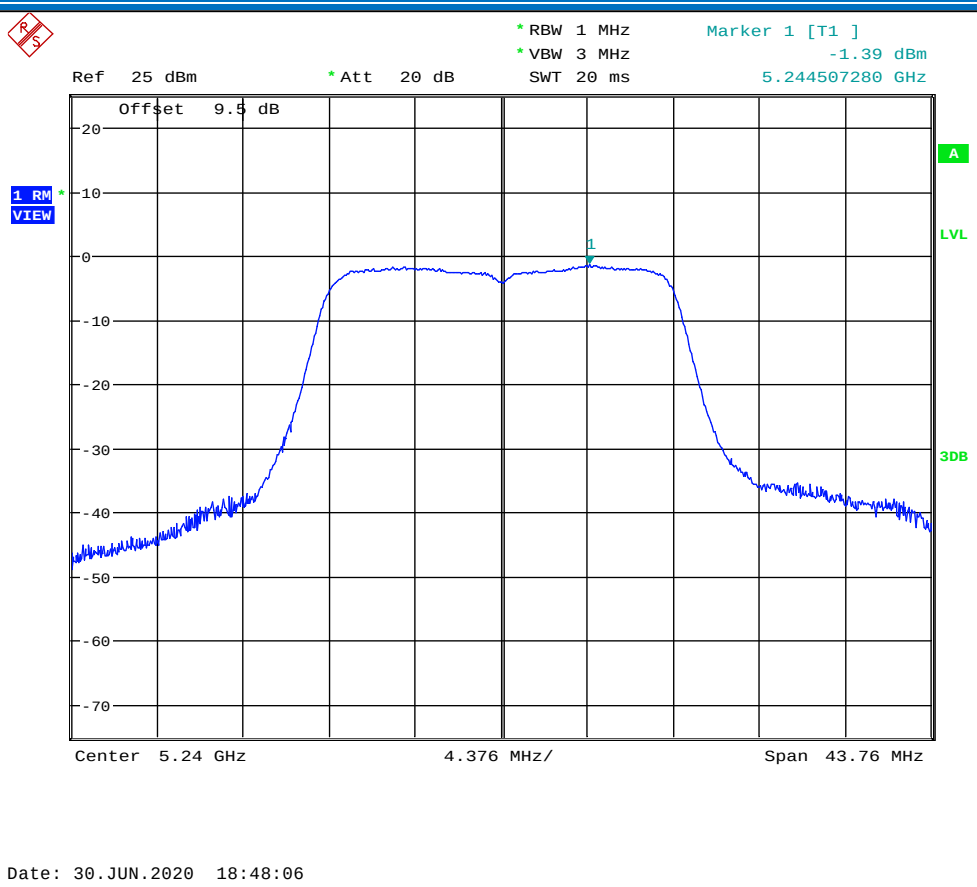

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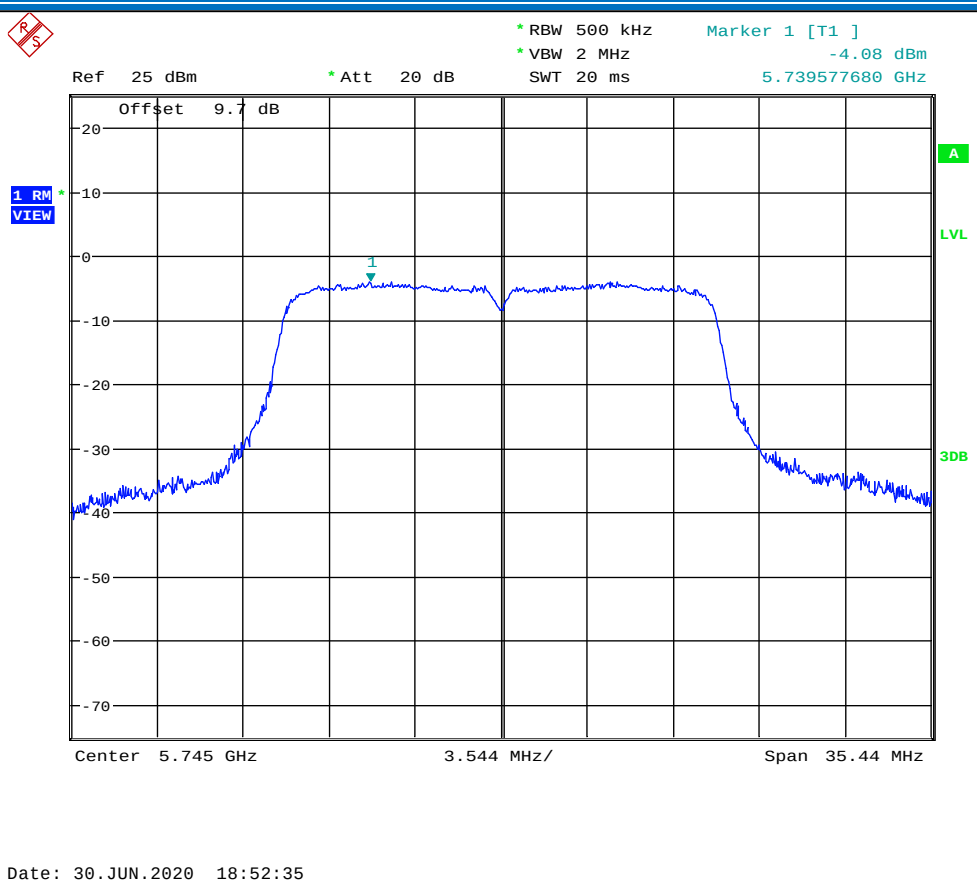

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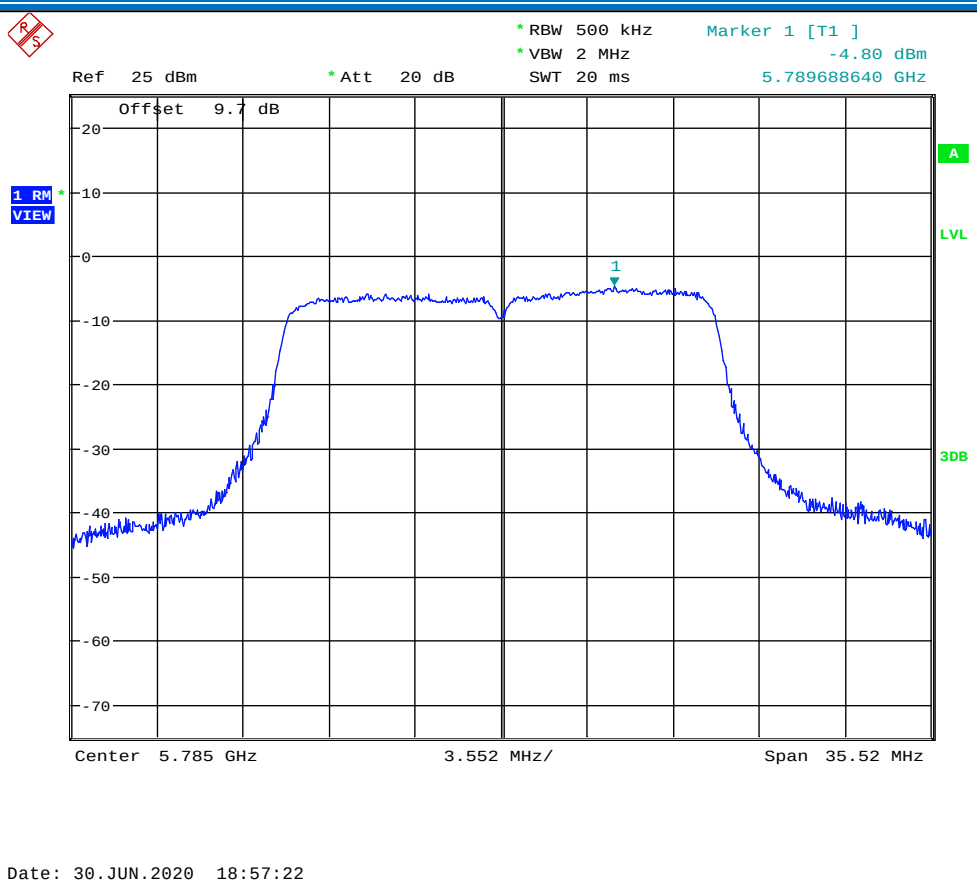
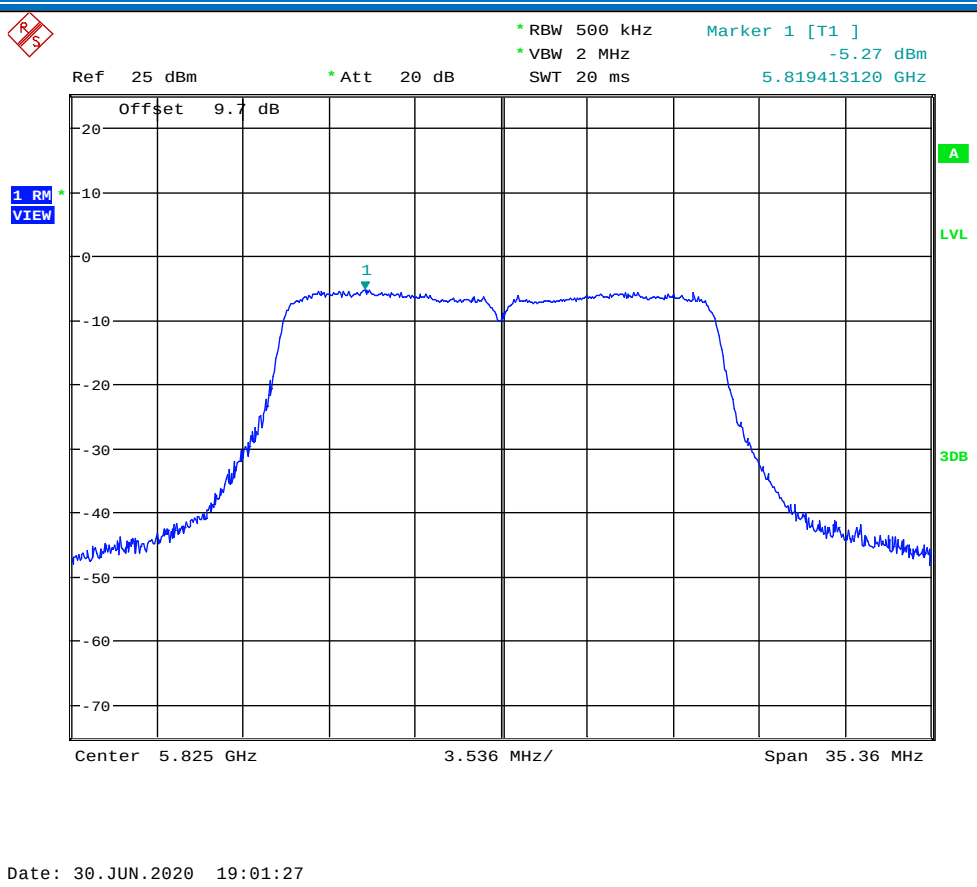


Maximum Power Spectral Density_TNVN_11AC20_5825_Ant1



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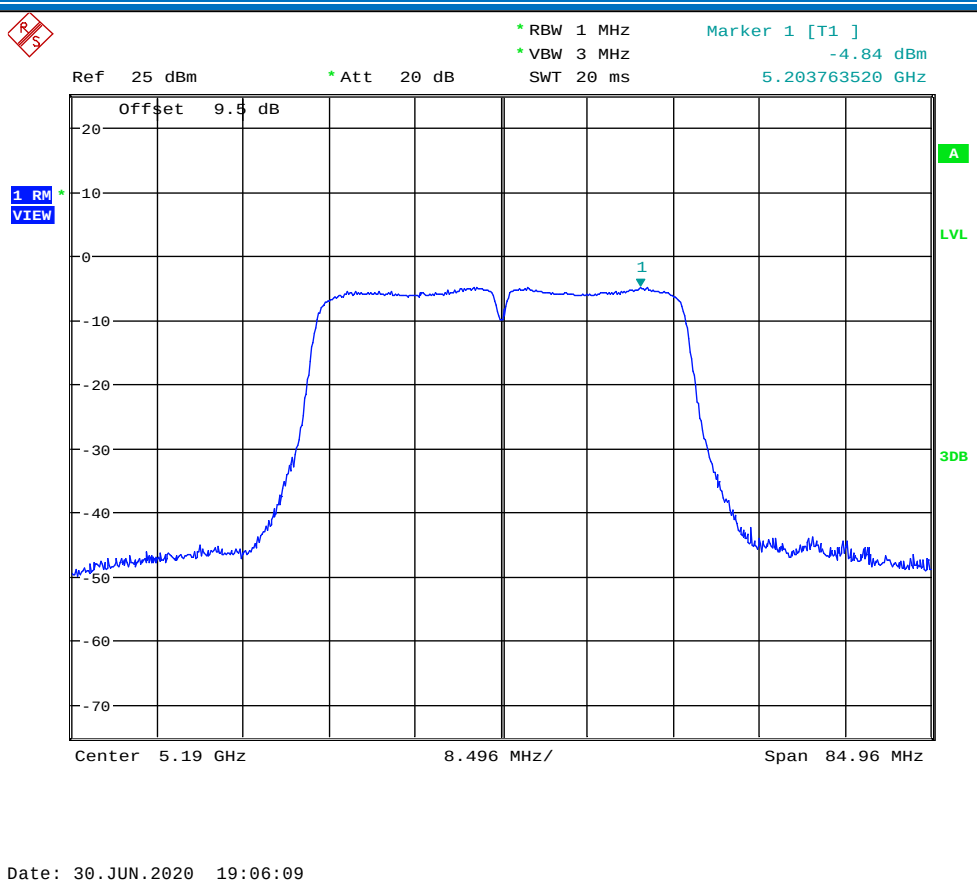

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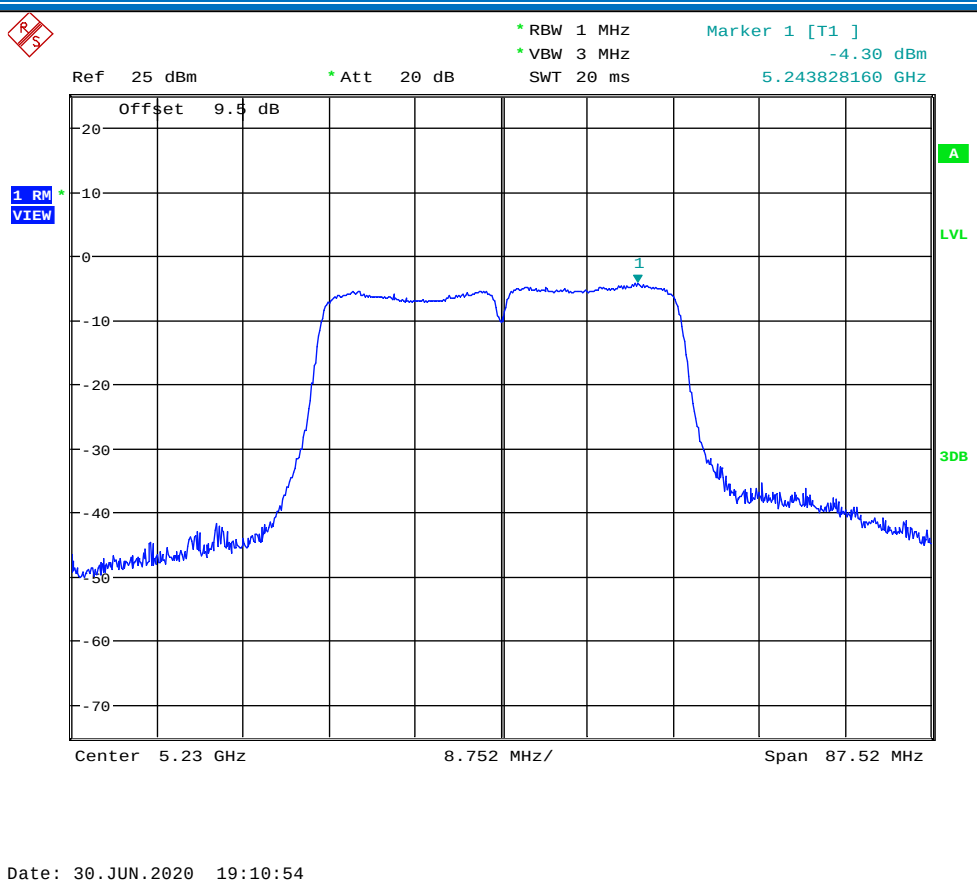
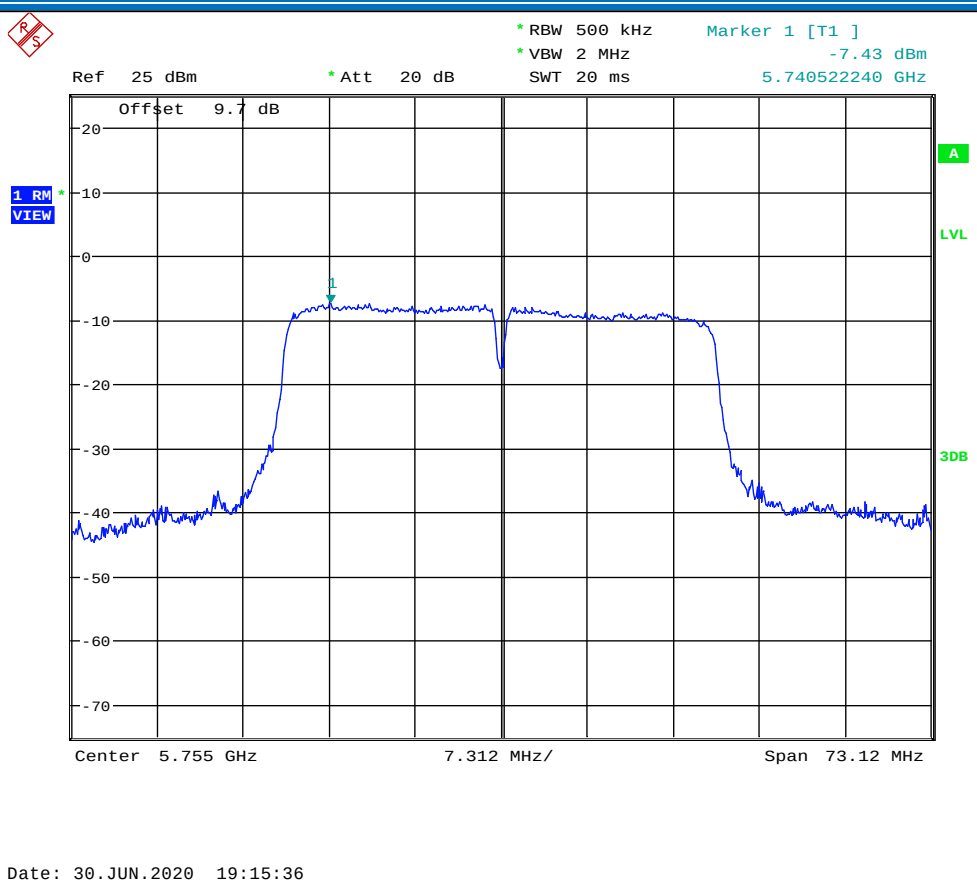


Maximum Power Spectral Density_TNVN_11AC40_5755_Ant1



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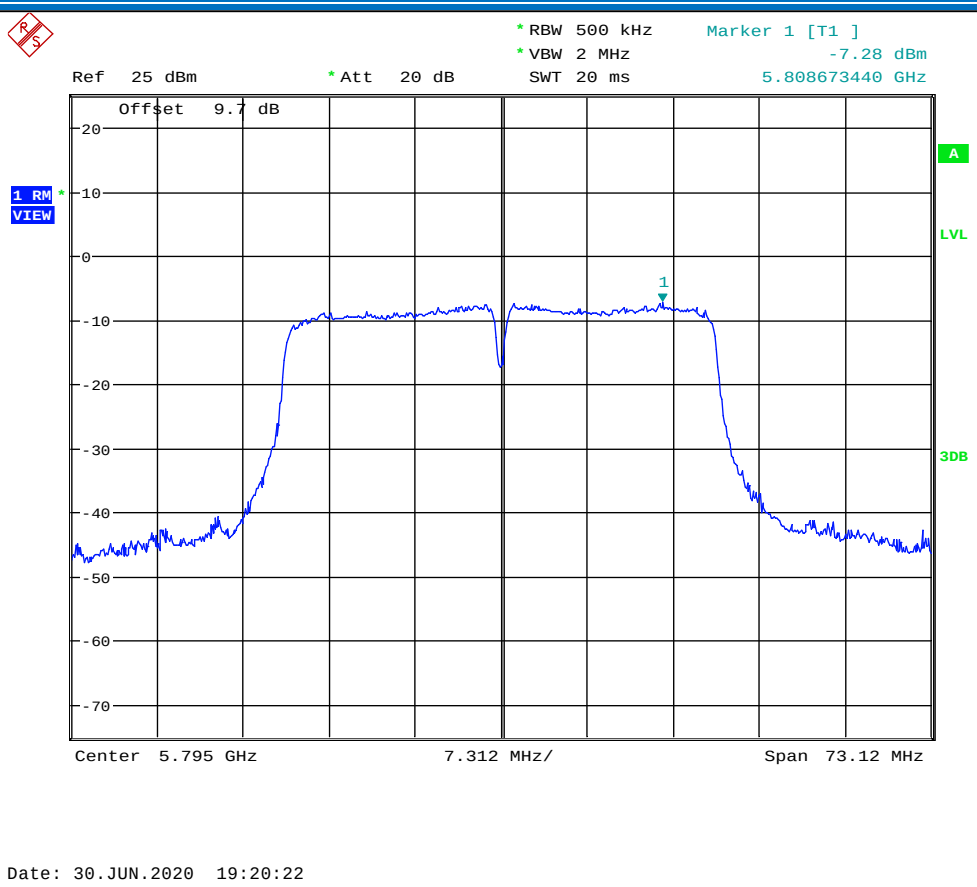

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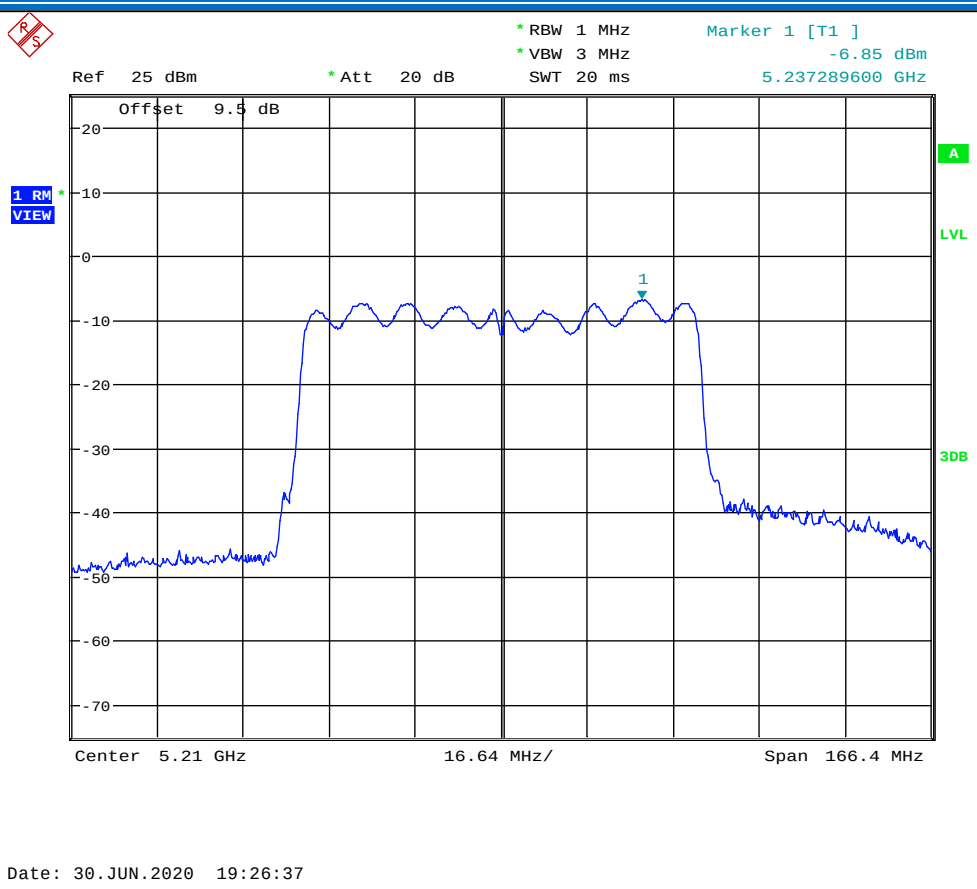

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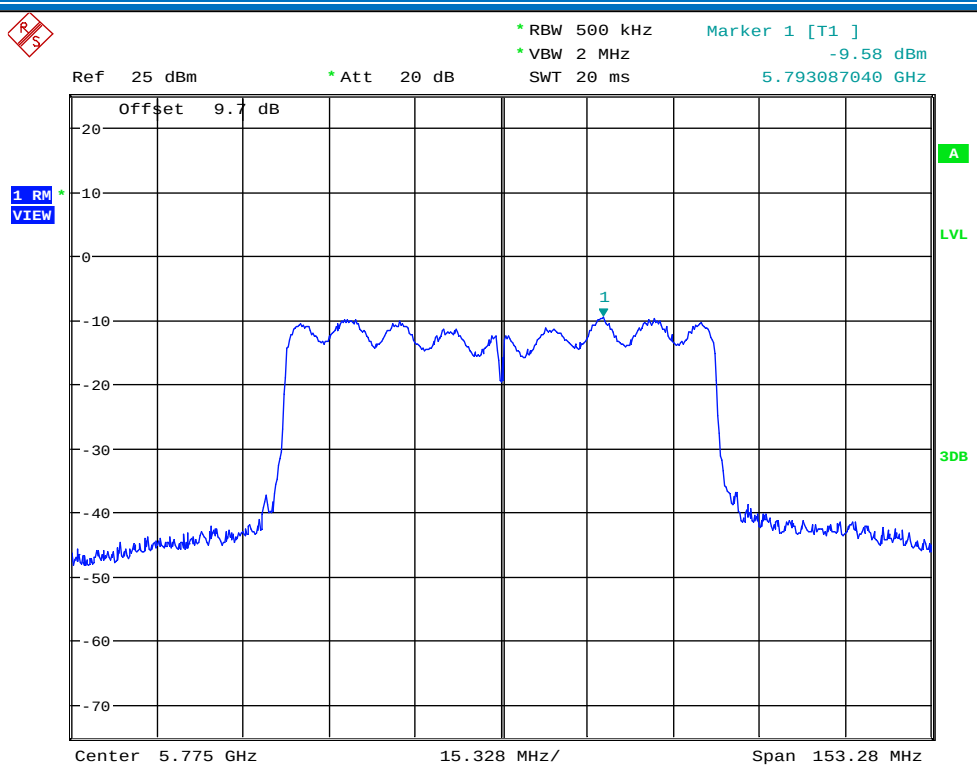
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VBW 2 MHz
SWT 20 ms
Marker 1 [T1]
-9.58 dBm
5.793087040 GHz
Ref 25 dBm
Att 20 dB
Offset 9.7 dB
1 RM
VIEW
A
LVL
3DB
Center 5.775 GHz
15.328 MHz/
Span 153.28 MHz
Date: 30.JUN.2020 19:32:23

Appendix D): Frequency Stability

Voltage vs. Frequency Stability								
Test Mode	Test Channel	Ant	Temp.	Volt.	Deviation [MHz]	Deviation [ppm]	Limit [ppm]	Verdict
11A	5180	Ant1	TN	VL	5179.97	-5.79151	20	PASS
11A	5180	Ant1	TN	VN	5179.97	-5.79151	20	PASS
11A	5180	Ant1	TN	VH	5179.99	-2.89575	20	PASS
11A	5200	Ant1	TN	VL	5199.96	-8.65385	20	PASS
11A	5200	Ant1	TN	VN	5199.96	-8.65385	20	PASS
11A	5200	Ant1	TN	VH	5199.96	-8.65385	20	PASS
11A	5240	Ant1	TN	VL	5239.99	-2.86260	20	PASS
11A	5240	Ant1	TN	VN	5239.97	-5.72519	20	PASS
11A	5240	Ant1	TN	VH	5239.99	-2.86260	20	PASS
11A	5745	Ant1	TN	VL	5744.94	-10.44386	20	PASS
11A	5745	Ant1	TN	VN	5744.96	-7.83290	20	PASS
11A	5745	Ant1	TN	VH	5744.94	-10.44386	20	PASS
11A	5785	Ant1	TN	VL	5785.00	0.00000	20	PASS
11A	5785	Ant1	TN	VN	5785.00	0.00000	20	PASS
11A	5785	Ant1	TN	VH	5785.00	0.00000	20	PASS
11A	5825	Ant1	TN	VL	5824.94	-10.30043	20	PASS
11A	5825	Ant1	TN	VN	5824.94	-10.30043	20	PASS
11A	5825	Ant1	TN	VH	5824.94	-10.30043	20	PASS
11N20	5180	Ant1	TN	VL	5180.00	0.00000	20	PASS
11N20	5180	Ant1	TN	VN	5179.99	-2.89575	20	PASS
11N20	5180	Ant1	TN	VH	5179.99	-2.89575	20	PASS
11N20	5200	Ant1	TN	VL	5199.96	-8.65385	20	PASS
11N20	5200	Ant1	TN	VN	5199.96	-8.65385	20	PASS
11N20	5200	Ant1	TN	VH	5199.96	-8.65385	20	PASS

11N20	5240	Ant1	TN	VL	5240.00	0.00000	20	PASS
11N20	5240	Ant1	TN	VN	5239.97	-5.72519	20	PASS
11N20	5240	Ant1	TN	VH	5239.97	-5.72519	20	PASS
11N20	5745	Ant1	TN	VL	5744.97	-5.22193	20	PASS
11N20	5745	Ant1	TN	VN	5744.96	-7.83290	20	PASS
11N20	5745	Ant1	TN	VH	5744.97	-5.22193	20	PASS
11N20	5785	Ant1	TN	VL	5785.00	0.00000	20	PASS
11N20	5785	Ant1	TN	VN	5785.00	0.00000	20	PASS
11N20	5785	Ant1	TN	VH	5784.99	-2.59291	20	PASS
11N20	5825	Ant1	TN	VL	5824.93	-12.87554	20	PASS
11N20	5825	Ant1	TN	VN	5824.97	-5.15022	20	PASS
11N20	5825	Ant1	TN	VH	5824.93	-12.87554	20	PASS
11N40	5190	Ant1	TN	VL	5190.00	0.00000	20	PASS
11N40	5190	Ant1	TN	VN	5189.97	-5.78035	20	PASS
11N40	5190	Ant1	TN	VH	5190.00	0.00000	20	PASS
11N40	5230	Ant1	TN	VL	5230.00	0.00000	20	PASS
11N40	5230	Ant1	TN	VN	5230.00	0.00000	20	PASS
11N40	5230	Ant1	TN	VH	5230.00	0.00000	20	PASS
11N40	5755	Ant1	TN	VL	5754.94	-10.42572	20	PASS
11N40	5755	Ant1	TN	VN	5754.91	-15.63858	20	PASS
11N40	5755	Ant1	TN	VH	5754.94	-10.42572	20	PASS
11N40	5795	Ant1	TN	VL	5795.03	5.17688	20	PASS
11N40	5795	Ant1	TN	VN	5795.00	0.00000	20	PASS
11N40	5795	Ant1	TN	VH	5795.00	0.00000	20	PASS
11AC20	5180	Ant1	TN	VL	5180.00	0.00000	20	PASS
11AC20	5180	Ant1	TN	VN	5179.99	-2.89575	20	PASS
11AC20	5180	Ant1	TN	VH	5179.99	-2.89575	20	PASS
11AC20	5200	Ant1	TN	VL	5199.96	-8.65385	20	PASS
11AC20	5200	Ant1	TN	VN	5199.97	-5.76923	20	PASS
11AC20	5200	Ant1	TN	VH	5199.99	-2.88462	20	PASS

11AC20	5240	Ant1	TN	VL	5239.99	-2.86260	20	PASS
11AC20	5240	Ant1	TN	VN	5239.97	-5.72519	20	PASS
11AC20	5240	Ant1	TN	VH	5239.97	-5.72519	20	PASS
11AC20	5745	Ant1	TN	VL	5744.94	-10.44386	20	PASS
11AC20	5745	Ant1	TN	VN	5744.94	-10.44386	20	PASS
11AC20	5745	Ant1	TN	VH	5744.96	-7.83290	20	PASS
11AC20	5785	Ant1	TN	VL	5785.00	0.00000	20	PASS
11AC20	5785	Ant1	TN	VN	5785.02	2.59291	20	PASS
11AC20	5785	Ant1	TN	VH	5785.00	0.00000	20	PASS
11AC20	5825	Ant1	TN	VL	5824.97	-5.15022	20	PASS
11AC20	5825	Ant1	TN	VN	5824.96	-7.72532	20	PASS
11AC20	5825	Ant1	TN	VH	5824.93	-12.87554	20	PASS
11AC40	5190	Ant1	TN	VL	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	TN	VN	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	TN	VH	5190.00	0.00000	20	PASS
11AC40	5230	Ant1	TN	VL	5230.00	0.00000	20	PASS
11AC40	5230	Ant1	TN	VN	5230.00	0.00000	20	PASS
11AC40	5230	Ant1	TN	VH	5230.00	0.00000	20	PASS
11AC40	5755	Ant1	TN	VL	5754.97	-5.21286	20	PASS
11AC40	5755	Ant1	TN	VN	5754.94	-10.42572	20	PASS
11AC40	5755	Ant1	TN	VH	5754.97	-5.21286	20	PASS
11AC40	5795	Ant1	TN	VL	5795.03	5.17688	20	PASS
11AC40	5795	Ant1	TN	VN	5795.00	0.00000	20	PASS
11AC40	5795	Ant1	TN	VH	5795.03	5.17688	20	PASS
11AC80	5210	Ant1	TN	VL	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	TN	VN	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	TN	VH	5210.00	0.00000	20	PASS
11AC80	5775	Ant1	TN	VL	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	TN	VN	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	TN	VH	5775.00	0.00000	20	PASS

Temperature vs. Frequency Stability								
Test Mode	Test Channel	Ant	Volt.	Temp.	Deviation [MHz]	Deviation [ppm]	Limit [ppm]	Verdict
11A	5180	Ant1	VN	-30	5179.99	-2.89575	20	PASS
11A	5180	Ant1	VN	-20	5179.99	-2.89575	20	PASS
11A	5180	Ant1	VN	-10	5179.97	-5.79151	20	PASS
11A	5180	Ant1	VN	0	5179.99	-2.89575	20	PASS
11A	5180	Ant1	VN	10	5179.97	-5.79151	20	PASS
11A	5180	Ant1	VN	20	5179.99	-2.89575	20	PASS
11A	5180	Ant1	VN	30	5179.99	-2.89575	20	PASS
11A	5180	Ant1	VN	40	5179.97	-5.79151	20	PASS
11A	5180	Ant1	VN	50	5179.97	-5.79151	20	PASS
11A	5200	Ant1	VN	-30	5199.96	-8.65385	20	PASS
11A	5200	Ant1	VN	-20	5199.96	-8.65385	20	PASS
11A	5200	Ant1	VN	-10	5199.96	-8.65385	20	PASS
11A	5200	Ant1	VN	0	5199.96	-8.65385	20	PASS
11A	5200	Ant1	VN	10	5199.97	-5.76923	20	PASS
11A	5200	Ant1	VN	20	5199.97	-5.76923	20	PASS
11A	5200	Ant1	VN	30	5199.97	-5.76923	20	PASS
11A	5200	Ant1	VN	40	5199.94	-11.53846	20	PASS
11A	5745	Ant1	VN	40	5744.94	-10.44386	20	PASS
11A	5745	Ant1	VN	50	5744.96	-7.83290	20	PASS
11A	5785	Ant1	VN	-30	5784.97	-5.18583	20	PASS
11A	5785	Ant1	VN	-20	5785.00	0.00000	20	PASS
11A	5785	Ant1	VN	-10	5784.99	-2.59291	20	PASS
11A	5785	Ant1	VN	0	5784.99	-2.59291	20	PASS
11A	5785	Ant1	VN	10	5784.99	-2.59291	20	PASS
11A	5785	Ant1	VN	20	5785.00	0.00000	20	PASS
11A	5785	Ant1	VN	30	5784.99	-2.59291	20	PASS

11A	5785	Ant1	VN	40	5784.99	-2.59291	20	PASS
11A	5785	Ant1	VN	50	5785.00	0.00000	20	PASS
11A	5825	Ant1	VN	-30	5824.93	-12.87554	20	PASS
11A	5825	Ant1	VN	-20	5824.93	-12.87554	20	PASS
11A	5825	Ant1	VN	-10	5824.94	-10.30043	20	PASS
11A	5825	Ant1	VN	0	5824.94	-10.30043	20	PASS
11A	5825	Ant1	VN	10	5824.94	-10.30043	20	PASS
11A	5825	Ant1	VN	20	5824.94	-10.30043	20	PASS
11A	5200	Ant1	VN	50	5199.96	-8.65385	20	PASS
11A	5240	Ant1	VN	-30	5239.96	-8.58779	20	PASS
11A	5240	Ant1	VN	-20	5239.99	-2.86260	20	PASS
11A	5240	Ant1	VN	-10	5239.97	-5.72519	20	PASS
11A	5240	Ant1	VN	0	5239.97	-5.72519	20	PASS
11A	5240	Ant1	VN	10	5239.97	-5.72519	20	PASS
11A	5240	Ant1	VN	20	5239.96	-8.58779	20	PASS
11A	5240	Ant1	VN	30	5239.99	-2.86260	20	PASS
11A	5240	Ant1	VN	40	5239.97	-5.72519	20	PASS
11A	5240	Ant1	VN	50	5239.97	-5.72519	20	PASS
11A	5745	Ant1	VN	-30	5744.96	-7.83290	20	PASS
11A	5745	Ant1	VN	-20	5744.94	-10.44386	20	PASS
11A	5745	Ant1	VN	-10	5744.94	-10.44386	20	PASS
11A	5745	Ant1	VN	0	5744.96	-7.83290	20	PASS
11A	5745	Ant1	VN	10	5744.96	-7.83290	20	PASS
11A	5745	Ant1	VN	20	5744.94	-10.44386	20	PASS
11A	5745	Ant1	VN	30	5744.96	-7.83290	20	PASS
11N20	5200	Ant1	VN	20	5199.96	-8.65385	20	PASS
11N20	5200	Ant1	VN	30	5199.96	-8.65385	20	PASS
11N20	5200	Ant1	VN	40	5199.94	-11.53846	20	PASS
11N20	5200	Ant1	VN	50	5199.97	-5.76923	20	PASS
11N20	5240	Ant1	VN	-30	5239.97	-5.72519	20	PASS

11N20	5240	Ant1	VN	-20	5239.96	-8.58779	20	PASS
11N20	5240	Ant1	VN	-10	5239.99	-2.86260	20	PASS
11N20	5240	Ant1	VN	0	5239.97	-5.72519	20	PASS
11N20	5240	Ant1	VN	10	5239.99	-2.86260	20	PASS
11N20	5240	Ant1	VN	20	5239.97	-5.72519	20	PASS
11N20	5240	Ant1	VN	30	5239.97	-5.72519	20	PASS
11N20	5240	Ant1	VN	40	5239.97	-5.72519	20	PASS
11N20	5240	Ant1	VN	50	5239.99	-2.86260	20	PASS
11N20	5745	Ant1	VN	-30	5744.97	-5.22193	20	PASS
11N20	5745	Ant1	VN	-20	5744.96	-7.83290	20	PASS
11N20	5745	Ant1	VN	-10	5744.97	-5.22193	20	PASS
11N20	5745	Ant1	VN	0	5744.96	-7.83290	20	PASS
11A	5825	Ant1	VN	30	5824.94	-10.30043	20	PASS
11A	5825	Ant1	VN	40	5824.94	-10.30043	20	PASS
11A	5825	Ant1	VN	50	5824.96	-7.72532	20	PASS
11N20	5180	Ant1	VN	-30	5179.99	-2.89575	20	PASS
11N20	5180	Ant1	VN	-20	5179.99	-2.89575	20	PASS
11N20	5180	Ant1	VN	-10	5179.99	-2.89575	20	PASS
11N20	5180	Ant1	VN	0	5179.99	-2.89575	20	PASS
11N20	5180	Ant1	VN	10	5179.97	-5.79151	20	PASS
11N20	5180	Ant1	VN	20	5179.97	-5.79151	20	PASS
11N20	5180	Ant1	VN	30	5179.99	-2.89575	20	PASS
11N20	5180	Ant1	VN	40	5179.99	-2.89575	20	PASS
11N20	5180	Ant1	VN	50	5180.00	0.00000	20	PASS
11N20	5200	Ant1	VN	-30	5199.97	-5.76923	20	PASS
11N20	5200	Ant1	VN	-20	5199.96	-8.65385	20	PASS
11N20	5200	Ant1	VN	-10	5199.96	-8.65385	20	PASS
11N20	5200	Ant1	VN	0	5199.96	-8.65385	20	PASS
11N20	5200	Ant1	VN	10	5199.97	-5.76923	20	PASS
11N20	5745	Ant1	VN	10	5744.96	-7.83290	20	PASS

11N20	5745	Ant1	VN	20	5744.97	-5.22193	20	PASS
11N20	5745	Ant1	VN	30	5744.97	-5.22193	20	PASS
11N20	5745	Ant1	VN	40	5744.96	-7.83290	20	PASS
11N20	5745	Ant1	VN	50	5744.96	-7.83290	20	PASS
11N20	5785	Ant1	VN	-30	5785.00	0.00000	20	PASS
11N20	5785	Ant1	VN	-20	5785.00	0.00000	20	PASS
11N20	5785	Ant1	VN	-10	5785.00	0.00000	20	PASS
11N20	5785	Ant1	VN	0	5784.99	-2.59291	20	PASS
11N20	5785	Ant1	VN	10	5785.00	0.00000	20	PASS
11N20	5785	Ant1	VN	20	5785.00	0.00000	20	PASS
11N20	5785	Ant1	VN	30	5785.00	0.00000	20	PASS
11N20	5785	Ant1	VN	40	5785.00	0.00000	20	PASS
11N20	5785	Ant1	VN	50	5785.00	0.00000	20	PASS
11N20	5825	Ant1	VN	-30	5824.94	-10.30043	20	PASS
11N20	5825	Ant1	VN	-20	5824.96	-7.72532	20	PASS
11N20	5825	Ant1	VN	-10	5824.94	-10.30043	20	PASS
11N20	5825	Ant1	VN	0	5824.94	-10.30043	20	PASS
11N20	5825	Ant1	VN	10	5824.96	-7.72532	20	PASS
11N20	5825	Ant1	VN	20	5824.94	-10.30043	20	PASS
11N20	5825	Ant1	VN	30	5824.96	-7.72532	20	PASS
11N20	5825	Ant1	VN	40	5824.94	-10.30043	20	PASS
11N20	5825	Ant1	VN	50	5824.96	-7.72532	20	PASS
11N40	5190	Ant1	VN	-30	5190.00	0.00000	20	PASS
11N40	5190	Ant1	VN	-20	5190.00	0.00000	20	PASS
11N40	5190	Ant1	VN	-10	5190.00	0.00000	20	PASS
11N40	5190	Ant1	VN	0	5190.00	0.00000	20	PASS
11N40	5190	Ant1	VN	10	5190.00	0.00000	20	PASS
11N40	5190	Ant1	VN	20	5190.03	5.78035	20	PASS
11N40	5190	Ant1	VN	30	5190.00	0.00000	20	PASS
11N40	5190	Ant1	VN	40	5190.00	0.00000	20	PASS

11N40	5190	Ant1	VN	50	5190.00	0.00000	20	PASS
11N40	5230	Ant1	VN	-30	5230.00	0.00000	20	PASS
11N40	5230	Ant1	VN	-20	5229.97	-5.73614	20	PASS
11N40	5230	Ant1	VN	-10	5230.00	0.00000	20	PASS
11N40	5230	Ant1	VN	0	5230.00	0.00000	20	PASS
11N40	5230	Ant1	VN	10	5229.97	-5.73614	20	PASS
11N40	5230	Ant1	VN	20	5230.00	0.00000	20	PASS
11N40	5230	Ant1	VN	30	5230.00	0.00000	20	PASS
11N40	5230	Ant1	VN	40	5230.03	5.73614	20	PASS
11N40	5230	Ant1	VN	50	5230.00	0.00000	20	PASS
11N40	5755	Ant1	VN	-30	5754.94	-10.42572	20	PASS
11N40	5755	Ant1	VN	-20	5754.94	-10.42572	20	PASS
11N40	5755	Ant1	VN	-10	5754.94	-10.42572	20	PASS
11N40	5755	Ant1	VN	0	5754.97	-5.21286	20	PASS
11N40	5755	Ant1	VN	10	5754.91	-15.63858	20	PASS
11N40	5755	Ant1	VN	20	5754.94	-10.42572	20	PASS
11N40	5755	Ant1	VN	30	5754.91	-15.63858	20	PASS
11N40	5755	Ant1	VN	40	5754.94	-10.42572	20	PASS
11N40	5755	Ant1	VN	50	5754.97	-5.21286	20	PASS
11N40	5795	Ant1	VN	-30	5795.03	5.17688	20	PASS
11N40	5795	Ant1	VN	-20	5795.00	0.00000	20	PASS
11N40	5795	Ant1	VN	-10	5794.97	-5.17688	20	PASS
11N40	5795	Ant1	VN	0	5795.00	0.00000	20	PASS
11N40	5795	Ant1	VN	10	5795.00	0.00000	20	PASS
11N40	5795	Ant1	VN	20	5795.03	5.17688	20	PASS
11N40	5795	Ant1	VN	30	5795.03	5.17688	20	PASS
11N40	5795	Ant1	VN	40	5795.03	5.17688	20	PASS
11N40	5795	Ant1	VN	50	5795.03	5.17688	20	PASS
11AC20	5180	Ant1	VN	-30	5180.00	0.00000	20	PASS
11AC20	5180	Ant1	VN	-20	5179.99	-2.89575	20	PASS

11AC20	5180	Ant1	VN	-10	5180.00	0.00000	20	PASS
11AC20	5180	Ant1	VN	0	5179.97	-5.79151	20	PASS
11AC20	5180	Ant1	VN	10	5179.99	-2.89575	20	PASS
11AC20	5180	Ant1	VN	20	5180.00	0.00000	20	PASS
11AC20	5180	Ant1	VN	30	5179.99	-2.89575	20	PASS
11AC20	5180	Ant1	VN	40	5179.97	-5.79151	20	PASS
11AC20	5180	Ant1	VN	50	5179.99	-2.89575	20	PASS
11AC20	5200	Ant1	VN	-30	5199.97	-5.76923	20	PASS
11AC20	5200	Ant1	VN	-20	5199.96	-8.65385	20	PASS
11AC20	5200	Ant1	VN	-10	5199.97	-5.76923	20	PASS
11AC20	5200	Ant1	VN	0	5199.96	-8.65385	20	PASS
11AC20	5200	Ant1	VN	10	5199.97	-5.76923	20	PASS
11AC20	5200	Ant1	VN	20	5199.96	-8.65385	20	PASS
11AC20	5200	Ant1	VN	30	5199.96	-8.65385	20	PASS
11AC20	5200	Ant1	VN	40	5199.96	-8.65385	20	PASS
11AC20	5200	Ant1	VN	50	5199.97	-5.76923	20	PASS
11AC20	5240	Ant1	VN	-30	5239.96	-8.58779	20	PASS
11AC20	5240	Ant1	VN	-20	5239.97	-5.72519	20	PASS
11AC20	5240	Ant1	VN	-10	5239.97	-5.72519	20	PASS
11AC20	5240	Ant1	VN	0	5239.99	-2.86260	20	PASS
11AC20	5240	Ant1	VN	10	5239.99	-2.86260	20	PASS
11AC20	5240	Ant1	VN	20	5239.96	-8.58779	20	PASS
11AC20	5240	Ant1	VN	30	5239.97	-5.72519	20	PASS
11AC20	5240	Ant1	VN	40	5239.99	-2.86260	20	PASS
11AC20	5240	Ant1	VN	50	5239.99	-2.86260	20	PASS
11AC20	5745	Ant1	VN	-30	5744.97	-5.22193	20	PASS
11AC20	5745	Ant1	VN	-20	5744.96	-7.83290	20	PASS
11AC20	5745	Ant1	VN	-10	5744.97	-5.22193	20	PASS
11AC20	5745	Ant1	VN	0	5744.97	-5.22193	20	PASS
11AC20	5745	Ant1	VN	10	5744.97	-5.22193	20	PASS

11AC20	5745	Ant1	VN	20	5744.97	-5.22193	20	PASS
11AC20	5745	Ant1	VN	30	5744.97	-5.22193	20	PASS
11AC20	5745	Ant1	VN	40	5744.97	-5.22193	20	PASS
11AC20	5745	Ant1	VN	50	5744.96	-7.83290	20	PASS
11AC20	5785	Ant1	VN	-30	5784.99	-2.59291	20	PASS
11AC20	5785	Ant1	VN	-20	5785.00	0.00000	20	PASS
11AC20	5785	Ant1	VN	-10	5785.00	0.00000	20	PASS
11AC20	5785	Ant1	VN	0	5785.00	0.00000	20	PASS
11AC20	5785	Ant1	VN	10	5785.00	0.00000	20	PASS
11AC20	5785	Ant1	VN	20	5785.00	0.00000	20	PASS
11AC20	5785	Ant1	VN	30	5784.99	-2.59291	20	PASS
11AC20	5785	Ant1	VN	40	5785.00	0.00000	20	PASS
11AC20	5785	Ant1	VN	50	5785.00	0.00000	20	PASS
11AC20	5825	Ant1	VN	-30	5824.94	-10.30043	20	PASS
11AC20	5825	Ant1	VN	-20	5824.94	-10.30043	20	PASS
11AC20	5825	Ant1	VN	-10	5824.97	-5.15022	20	PASS
11AC20	5825	Ant1	VN	0	5824.96	-7.72532	20	PASS
11AC20	5825	Ant1	VN	10	5824.94	-10.30043	20	PASS
11AC20	5825	Ant1	VN	20	5824.96	-7.72532	20	PASS
11AC20	5825	Ant1	VN	30	5824.97	-5.15022	20	PASS
11AC20	5825	Ant1	VN	40	5824.94	-10.30043	20	PASS
11AC20	5825	Ant1	VN	50	5824.94	-10.30043	20	PASS
11AC40	5190	Ant1	VN	-30	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	VN	-20	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	VN	-10	5189.97	-5.78035	20	PASS
11AC40	5190	Ant1	VN	0	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	VN	10	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	VN	20	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	VN	30	5190.00	0.00000	20	PASS
11AC40	5190	Ant1	VN	40	5190.00	0.00000	20	PASS

11AC40	5190	Ant1	VN	50	5189.97	-5.78035	20	PASS
11AC40	5230	Ant1	VN	-30	5230.00	0.00000	20	PASS
11AC40	5230	Ant1	VN	-20	5230.00	0.00000	20	PASS
11AC40	5230	Ant1	VN	-10	5230.00	0.00000	20	PASS
11AC40	5230	Ant1	VN	0	5230.00	0.00000	20	PASS
11AC40	5230	Ant1	VN	10	5229.97	-5.73614	20	PASS
11AC40	5230	Ant1	VN	20	5229.97	-5.73614	20	PASS
11AC40	5230	Ant1	VN	30	5230.00	0.00000	20	PASS
11AC40	5230	Ant1	VN	40	5229.97	-5.73614	20	PASS
11AC40	5230	Ant1	VN	50	5230.00	0.00000	20	PASS
11AC40	5755	Ant1	VN	-30	5754.97	-5.21286	20	PASS
11AC40	5755	Ant1	VN	-20	5754.91	-15.63858	20	PASS
11AC40	5755	Ant1	VN	-10	5754.97	-5.21286	20	PASS
11AC40	5755	Ant1	VN	0	5754.91	-15.63858	20	PASS
11AC40	5755	Ant1	VN	10	5754.94	-10.42572	20	PASS
11AC40	5755	Ant1	VN	20	5754.94	-10.42572	20	PASS
11AC40	5755	Ant1	VN	30	5754.94	-10.42572	20	PASS
11AC40	5755	Ant1	VN	40	5754.91	-15.63858	20	PASS
11AC40	5755	Ant1	VN	50	5754.94	-10.42572	20	PASS
11AC40	5795	Ant1	VN	-30	5795.03	5.17688	20	PASS
11AC40	5795	Ant1	VN	-20	5795.00	0.00000	20	PASS
11AC40	5795	Ant1	VN	-10	5794.97	-5.17688	20	PASS
11AC40	5795	Ant1	VN	0	5795.00	0.00000	20	PASS
11AC40	5795	Ant1	VN	10	5795.00	0.00000	20	PASS
11AC40	5795	Ant1	VN	20	5795.03	5.17688	20	PASS
11AC40	5795	Ant1	VN	30	5795.03	5.17688	20	PASS
11AC40	5795	Ant1	VN	40	5794.97	-5.17688	20	PASS
11AC40	5795	Ant1	VN	50	5795.03	5.17688	20	PASS
11AC80	5210	Ant1	VN	-30	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	VN	-20	5210.00	0.00000	20	PASS

11AC80	5210	Ant1	VN	-10	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	VN	0	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	VN	10	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	VN	20	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	VN	30	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	VN	40	5210.00	0.00000	20	PASS
11AC80	5210	Ant1	VN	50	5210.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	-30	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	-20	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	-10	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	0	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	10	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	20	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	30	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	40	5775.00	0.00000	20	PASS
11AC80	5775	Ant1	VN	50	5775.00	0.00000	20	PASS

Appendix E): Antenna Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.407(a)(1) (2) requirement:

The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:	Please see EUT internal photos.

The antenna is internal antenna with ipex connector.The best case gain of the 5G WiFi antenna is 3.04dBi@Band 1, 4.42dBi@Band 4,.

Appendix F): Operation in the absence of information to the transmit

15.407(c) requirement: The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signal ling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.
Operation in the absence of information to the transmit
While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission. (manufacturer declare)

Appendix G): AC Power Line Conducted Emission

Test Procedure:	Test frequency range :150KHz-30MHz 1)The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Limit:	

Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

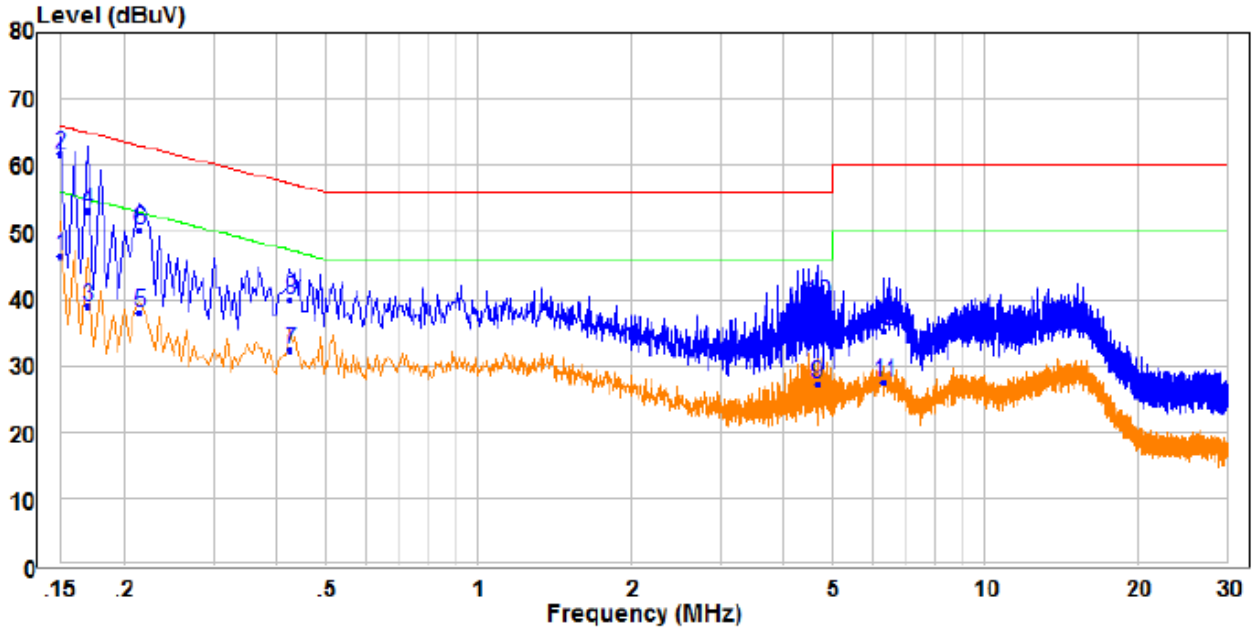
* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE : The lower limit is applicable at the transition frequency

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

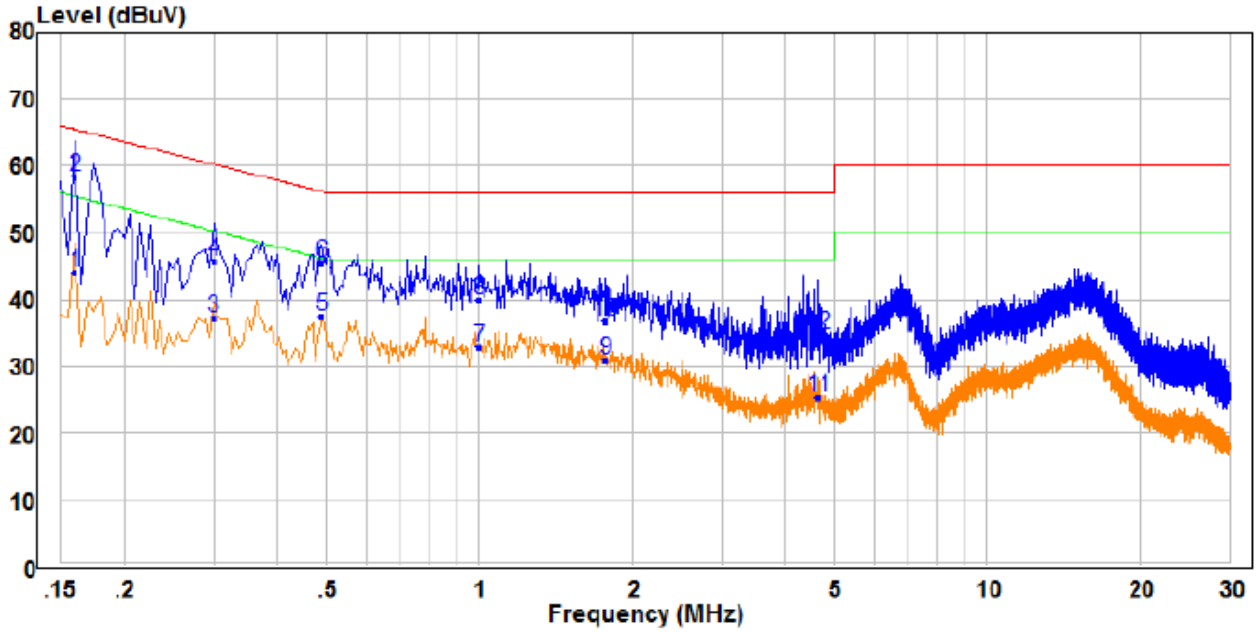
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	AV	0.150	36.88	9.49	46.37	56.00	-9.63	Average	Line
2	PP	0.150	52.25	9.49	61.74	66.00	-4.26	QP	Line
3		0.170	29.50	9.49	38.99	54.96	-15.97	Average	Line
4		0.170	43.74	9.49	53.23	64.96	-11.73	QP	Line
5		0.215	28.35	9.49	37.84	53.01	-15.17	Average	Line
6		0.215	40.79	9.49	50.28	63.01	-12.73	QP	Line
7		0.425	22.72	9.51	32.23	47.35	-15.12	Average	Line
8		0.425	30.46	9.51	39.97	57.35	-17.38	QP	Line
9		4.665	17.54	9.72	27.26	46.00	-18.74	Average	Line
10		4.665	29.59	9.72	39.31	56.00	-16.69	QP	Line
11		6.340	17.74	9.72	27.46	50.00	-22.54	Average	Line
12		6.340	25.57	9.72	35.29	60.00	-24.71	QP	Line

Neutral line:



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.160	34.64	9.48	44.12	55.46	-11.34	Average	Neutral
2	PP	0.160	48.88	9.48	58.36	65.46	-7.10	QP	Neutral
3		0.300	27.82	9.48	37.30	50.24	-12.94	Average	Neutral
4		0.300	36.30	9.48	45.78	60.24	-14.46	QP	Neutral
5	AV	0.490	27.77	9.59	37.36	46.17	-8.81	Average	Neutral
6		0.490	35.87	9.59	45.46	56.17	-10.71	QP	Neutral
7		1.000	23.00	9.72	32.72	46.00	-13.28	Average	Neutral
8		1.000	30.11	9.72	39.83	56.00	-16.17	QP	Neutral
9		1.775	21.23	9.72	30.95	46.00	-15.05	Average	Neutral
10		1.775	26.96	9.72	36.68	56.00	-19.32	QP	Neutral
11		4.650	15.61	9.80	25.41	46.00	-20.59	Average	Neutral
12		4.650	25.05	9.80	34.85	56.00	-21.15	QP	Neutral

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

Appendix H): Restricted bands around fundamental frequency (Radiated Emission)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
h. Test the EUT in the lowest channel , the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Limit (dBμV/m @3cm)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test plot as follows:

Worse case mode:		802.11a(6Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150	55.85	-3.63	52.22	74	-21.78	peak	H
5150	43.24	-3.63	39.61	54	-14.39	AVG	H
5150	55.98	-3.63	52.35	74	-21.65	peak	V
5150	42.96	-3.63	39.33	54	-14.67	AVG	V

Worse case mode:		802.11a(6Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350	55.77	-3.59	52.18	74	-21.82	peak	H
5350	45.04	-3.59	41.45	54	-12.55	AVG	H
5350	56.14	-3.59	52.55	74	-21.45	peak	V
5350	42.68	-3.59	39.09	54	-14.91	AVG	V

Worse case mode:		802.11a(6Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650	56.68	-3.46	53.22	68.2	-14.98	peak	H
5740.90	98.06	-3.44	94.62	122.2	-27.58	peak	H
5650	56.73	-3.46	53.27	68.2	-14.93	peak	V
5744.84	96.12	-3.44	92.68	122.2	-29.52	peak	V

Worse case mode:		802.11a(6Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5823.64	97.08	-3.42	93.66	122.2	-28.54	peak	H
5925	56.12	-3.41	52.71	68.2	-15.49	peak	H
5824.99	98.60	-3.42	95.18	122.2	-27.02	peak	V
5925	57.58	-3.41	54.17	68.2	-14.03	peak	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150	58.93	-3.63	50.29	74	-23.71	peak	H
5150	44.56	-3.63	39.45	54	-14.55	AVG	H
5150	59.65	-3.63	50.53	74	-23.47	peak	V
5150	46.6	-3.63	40.26	54	-13.74	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350	54.11	-3.59	50.52	74	-23.48	peak	H
5350	43.67	-3.59	40.08	54	-13.92	AVG	H
5350	54.17	-3.59	50.58	74	-23.42	peak	V
5350	43.81	-3.59	40.22	54	-13.78	AVG	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650	58.00	-3.46	54.54	68.2	-13.66	peak	H
5741.57	96.33	-3.44	92.89	122.2	-29.31	peak	H
5650	57.03	-3.46	53.57	68.2	-14.63	peak	V
5741.24	97.33	-3.44	93.89	122.2	-28.31	peak	V

Worse case mode:		802.11n(HT20)(6.5Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5826.17	96.81	-3.42	93.39	122.2	-28.81	peak	H
5925	56.65	-3.41	53.24	68.2	-14.96	peak	H
5826.24	98.16	-3.42	94.74	122.2	-27.46	peak	V
5925	56.23	-3.41	52.82	68.2	-15.38	peak	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		38	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150	53.96	-3.63	50.33	74	-23.67	peak	H
5150	45.06	-3.63	41.43	54	-12.57	AVG	H
5150	55.89	-3.63	52.26	74	-21.74	peak	V
5150	43.64	-3.63	40.01	54	-13.99	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		46	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350	54.54	-3.59	50.95	74	-23.05	peak	H
5350	45.25	-3.59	41.66	54	-12.34	AVG	H
5350	53.98	-3.59	50.39	74	-23.61	peak	V
5350	43.74	-3.59	40.15	54	-13.85	AVG	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		151	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650	58.57	-3.46	55.11	68.2	-13.09	peak	H
5754.69	97.75	-3.44	94.31	122.2	-27.89	peak	H
5650	56.53	-3.46	53.07	68.2	-15.13	peak	V
5757.16	97.11	-3.44	93.67	122.2	-28.53	peak	V

Worse case mode:		802.11n(HT40)(13.5Mbps)		Test channel:		159	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5781.81	96.37	-3.42	92.95	122.2	-29.25	peak	H
5925	56.38	-3.41	52.97	68.2	-15.23	peak	H
5784.64	96.19	-3.42	92.77	122.2	-29.43	peak	V
5925	57.75	-3.41	54.34	68.2	-13.86	peak	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		36	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150	56.51	-3.63	52.88	74	-21.12	peak	H
5150	44.14	-3.63	40.51	54	-13.49	AVG	H
5150	55.17	-3.63	51.54	74	-22.46	peak	V
5150	45.57	-3.63	41.94	54	-12.06	AVG	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		48	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350	53.98	-3.59	50.39	74	-23.61	peak	H
5350	43.80	-3.59	40.21	54	-13.79	AVG	H
5350	54.15	-3.59	50.56	74	-23.44	peak	V
5350	44.12	-3.59	40.53	54	-13.47	AVG	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		149	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650	58.52	-3.46	55.06	68.2	-13.14	peak	H
5739.20	98.38	-3.44	94.94	122.2	-27.26	peak	H
5650	57.28	-3.46	53.82	68.2	-14.38	peak	V
5736.21	98.48	-3.44	95.04	122.2	-27.16	peak	V

Worse case mode:		802.11ac(HT20)(6.5Mbps)		Test channel:		165	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5825.52	97.68	-3.42	94.26	122.2	-27.94	peak	H
5925	56.60	-3.41	53.19	68.2	-15.01	peak	H
5820.02	96.94	-3.42	93.52	122.2	-28.68	peak	V
5925	57.16	-3.41	53.75	68.2	-14.45	peak	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		38	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150	56.53	-3.63	52.90	74	-21.10	peak	H
5150	43.42	-3.63	39.79	54	-14.21	AVG	H
5150	56.25	-3.63	52.62	74	-21.38	peak	V
5150	42.98	-3.63	39.35	54	-14.65	AVG	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		46	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5350	54.20	-3.59	50.61	74	-23.39	peak	H
5350	43.40	-3.59	39.81	54	-14.19	AVG	H
5350	54.53	-3.59	50.94	74	-23.06	peak	V
5350	44.53	-3.59	40.94	54	-13.06	AVG	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		151	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650	58.04	-3.46	54.58	68.2	-13.62	peak	H
5752.29	96.83	-3.44	93.39	122.2	-28.81	peak	H
5650	57.90	-3.46	54.44	68.2	-13.76	peak	V
5754.03	97.74	-3.44	94.30	122.2	-27.90	peak	V

Worse case mode:		802.11ac(VHT40)(13.5Mbps)		Test channel:		159	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5795.02	96.03	-3.42	92.61	122.2	-29.59	peak	H
5925	56.05	-3.41	52.64	68.2	-15.56	peak	H
5793.16	97.76	-3.42	94.34	122.2	-27.86	peak	V
5925	58.34	-3.41	54.93	68.2	-13.27	peak	V

Worse case mode:		802.11ac(VHT80)(29.3Mbps)		Test channel:		42	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5150	53.89	-3.63	50.26	74	-23.74	peak	H
5150	43.25	-3.63	39.62	54	-14.38	AVG	H
5150	55.39	-3.63	51.76	74	-22.24	peak	V
5150	43.75	-3.63	40.12	54	-13.88	AVG	V
5350	55.60	-3.59	52.01	74	-21.99	peak	H
5350	45.01	-3.59	41.42	54	-12.58	AVG	H
5350	54.61	-3.59	51.02	74	-22.98	peak	V
5350	42.98	-3.59	39.39	54	-14.61	AVG	V

Worse case mode:		802.11ac(VHT80)(29.3Mbps)		Test channel:		155	
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detector Type	Ant. Pol.
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V
5650	55.84	-3.46	52.38	68.2	-15.82	peak	H
5773.61	96.72	-3.44	93.28	122.2	-28.92	peak	H
5925	55.80	-3.46	52.34	68.2	-15.86	peak	H
5650	56.38	-3.41	52.97	68.2	-15.23	peak	V
5777.00	96.71	-3.42	93.29	122.2	-28.91	peak	V
5925	56.13	-3.41	52.72	68.2	-15.48	peak	V

Note:
1) Through Pre-scan transmitting mode with all kind of modulation and data rate, find the MCS0 is the worst case of 802.11a; MCS0 is the worst case of 802.11n(20M)(40M); MCS0 is the worst case of 802.11ac(20M)(40M)(80M); and then Only the worst case is recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading - Correct Factor
Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor
3) All modes and antenna are tested, and found the antenna 1 which is worst case for 802.11a/n(20M)(40M)/ac(20M)(40M)(80M),so only the worst case mode is recorded in the report.

Appendix I): Radiated Spurious Emissions

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre)
h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
j. Repeat above procedures until all frequencies measured was complete.

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBμV/cm)	Remark	Measurement distance (cm)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

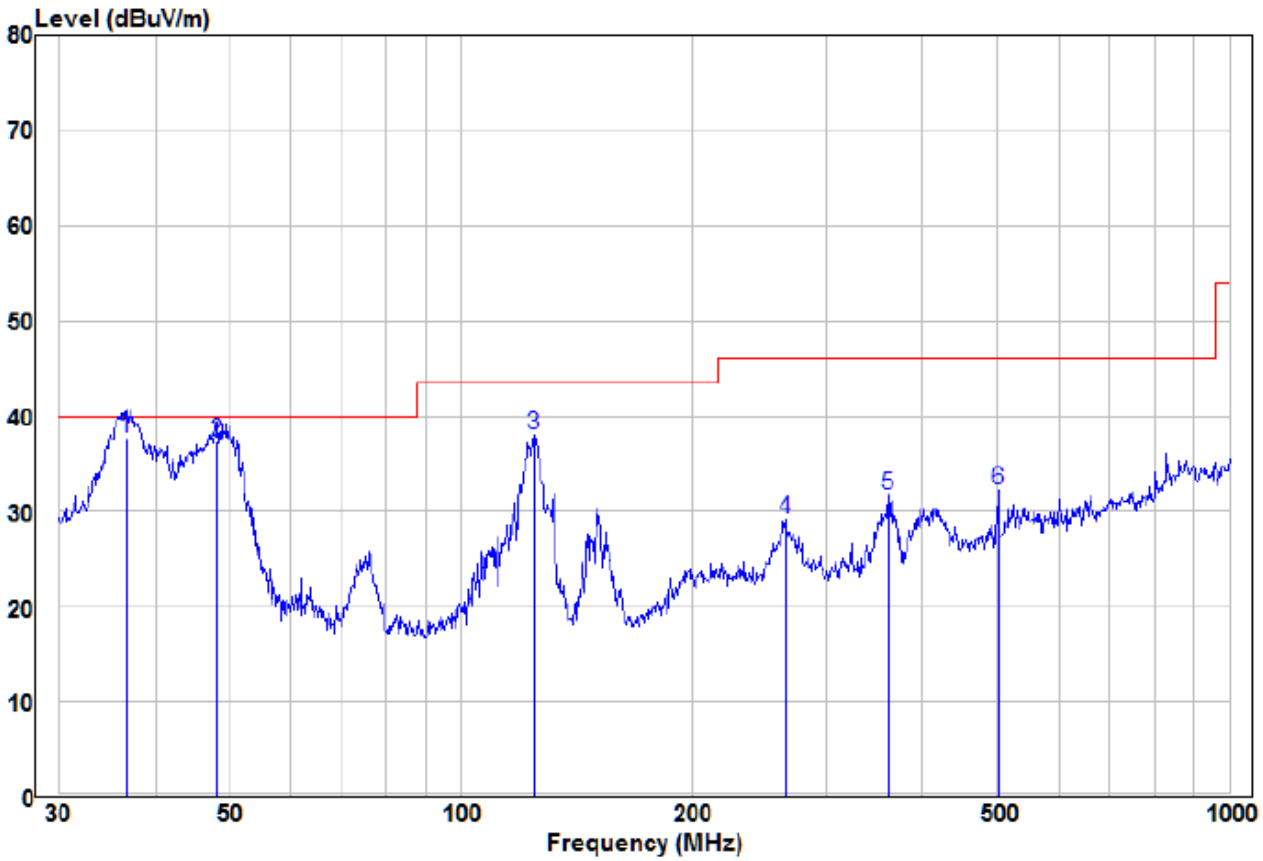
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test result: PASS

Test Data:

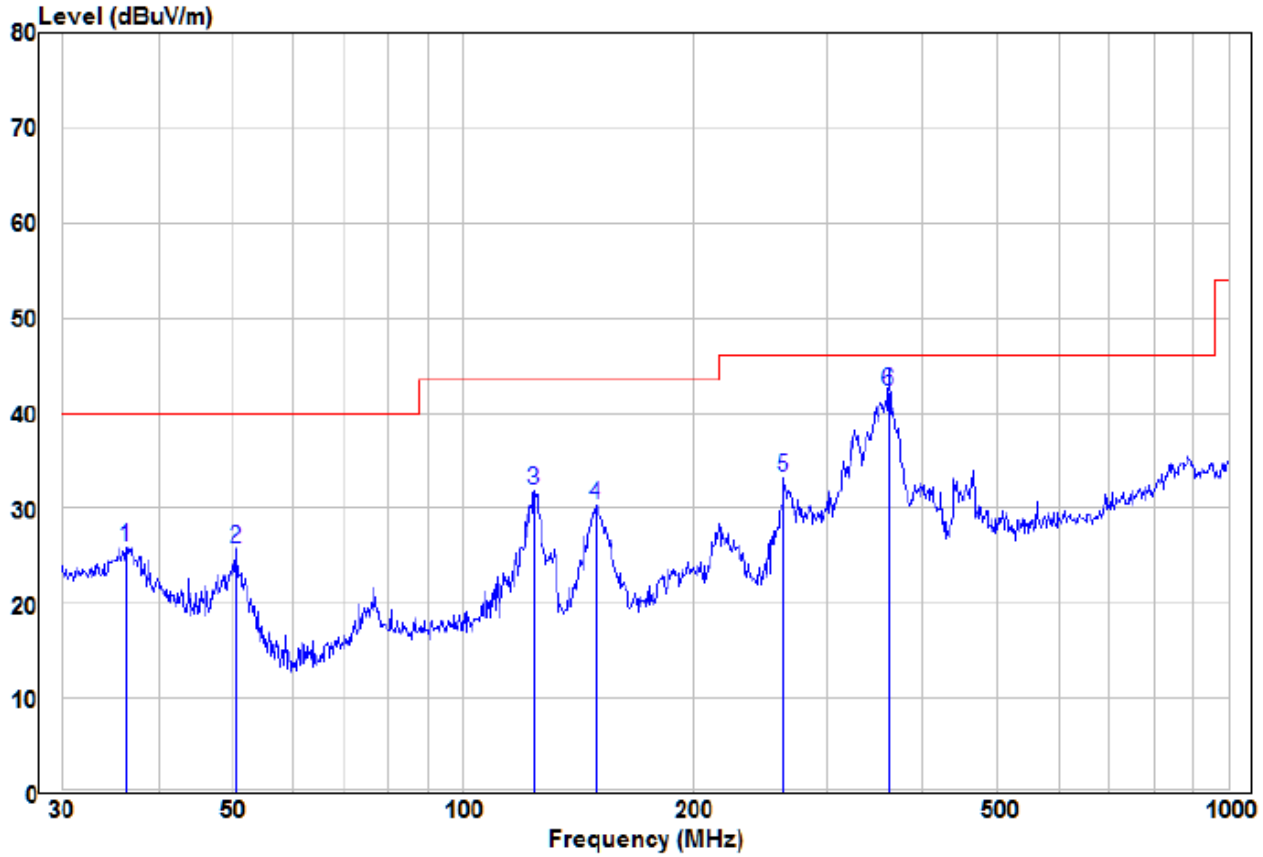
Radiated Emission below 1GHz

30MHz~1GHz		
Test mode:	Transmitting	Vertical



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1 pp	36.77	22.71	15.02	37.73	40.00	-2.27	QP	VERTICAL
2	48.33	28.31	9.07	37.38	40.00	-2.62	QP	VERTICAL
3 pk	124.57	27.07	11.05	38.12	43.50	-5.38	Peak	VERTICAL
4	264.75	14.95	14.26	29.21	46.00	-16.79	Peak	VERTICAL
5	360.45	14.55	17.21	31.76	46.00	-14.24	Peak	VERTICAL
6	501.18	13.44	18.88	32.32	46.00	-13.68	Peak	VERTICAL

Test mode:	Transmitting	Horizontal



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	36.38	10.82	15.06	25.88	40.00	-14.12	Peak	HORIZONTAL
2	50.59	18.08	7.70	25.78	40.00	-14.22	Peak	HORIZONTAL
3 pk	124.13	20.83	11.10	31.93	43.50	-11.57	Peak	HORIZONTAL
4	149.49	20.84	9.50	30.34	43.50	-13.16	Peak	HORIZONTAL
5	262.90	19.05	14.20	33.25	46.00	-12.75	Peak	HORIZONTAL
6 pp	360.45	25.10	17.21	42.31	46.00	-3.69	QP	HORIZONTAL

Transmitter Emission above 1GHz

Test mode:	802.11a(6Mbps)			Test channel:		48	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
10480	49.71	2.31	52.02	74	-21.98	peak	H
10480	37.38	2.31	39.69	54	-14.31	AVG	H
15720	42.00	3.79	45.79	74	-28.21	peak	H
15720	29.53	3.79	33.32	54	-20.68	AVG	H
10480	48.41	2.31	50.72	74	-23.28	peak	V
10480	37.68	2.31	39.99	54	-14.01	AVG	V
15720	41.99	3.79	45.78	74	-28.22	peak	V
15720	29.41	3.79	33.20	54	-20.80	AVG	V

Remark:

1) The 6Mbps of rate of 802.11a at 48 channel is the worst case, only the worst data recorded in the report.
2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
3) Scan from 9kHz to 40GHz,The disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

PHOTOGRAPHS OF EUT Constructional Details

Refer to SMC-EXPLORER-Internal photos and SMC-EXPLORER-External photos.

*** End of Report ***