



FCC RF Test Report

APPLICANT : vivo Mobile Communication Co., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : vivo
MODEL NAME : V2202
FCC ID : 2AUCY-V2202
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Jul. 11, 2022 ~ Jul. 15, 2022

We, Sporton International Inc. (ShenZhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (ShenZhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (ShenZhen)

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People's Republic of China



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REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|------------|---------|-------------------------|---------------|
| FR260813F | Rev. 01 | Initial issue of report | Aug. 05, 2022 |
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SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|----------------|--------------------|--------------------------------------|-----------------------------|--------|-----------------------------------|
| 3.1 | 15.403(i) | 6dB, 26dB and 99% Occupied Bandwidth | > 500kHz | Pass | - |
| 3.2 | 15.407(a) | Maximum Conducted Output Power | ≤ 30 dBm | Pass | - |
| 3.3 | 15.407(a) | Power Spectral Density | ≤ 30 dBm/500kHz | Pass | - |
| 3.4 | 15.407(b) | Unwanted Emissions | 15.407(b)(4)(i) & 15.209(a) | Pass | Under limit 9.78 dB at 56.190 MHz |
| 3.5 | 15.207 | AC Conducted Emission | 15.207(a) | Pass | Under limit 14.95 dB at 1.730 MHz |
| 3.6 | 15.203 & 15.407(a) | Antenna Requirement | 15.203 & 15.407(a) | Pass | - |

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

vivo Mobile Communication Co., Ltd.
No.1, vivo Road, Chang'an, Dongguan,Guangdong,China

1.2 Manufacturer

vivo Mobile Communication Co., Ltd.
No.1, vivo Road, Chang'an, Dongguan,Guangdong,China

1.3 Product Feature of Equipment Under Test

| Product Feature | |
|-----------------|---|
| Equipment | Mobile Phone |
| Brand Name | vivo |
| Model Name | V2202 |
| FCC ID | 2AUCY-V2202 |
| IMEI Code | Conducted: 866295060094959 / 866295060094942 Conduction: 866295060094033 / 866295060094025 Radiation: 866295060093910 / 866295060093902 |
| HW Version | MP_0.1 |
| SW Version | PD2215CF_EX_A_12.0.3.8.W30.V000L1 |
| EUT Stage | Production Unit |

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification | |
|---|---|
| Tx/Rx Channel Frequency Range | 5745 MHz ~ 5825 MHz |
| Maximum Output Power | <p><Ant. 1> <5745 MHz ~ 5825 MHz> 802.11a : 17.71 dBm / 0.0590 W 802.11n HT20 : 17.10 dBm / 0.0513 W 802.11n HT40 : 16.41 dBm / 0.0438 W 802.11ac VHT20: 15.69 dBm / 0.0371 W 802.11ac VHT40: 15.92 dBm / 0.0391 W 802.11ac VHT80: 15.37 dBm / 0.0344 W 802.11ax HE20: 15.00 dBm / 0.0316 W 802.11ax HE40: 15.08 dBm / 0.0322 W 802.11ax HE80: 14.74 dBm / 0.0298 W</p> |
| 99% Occupied Bandwidth | 802.11a : 18.422 MHz 802.11n HT20 : 19.341 MHz 802.11n HT40 : 36.603 MHz 802.11ac VHT80 : 76.404 MHz 802.11ax HE20 : 19.221 MHz 802.11ax HE40 : 37.802 MHz 802.11ax HE80 : 78.162 MHz |
| Type of Modulation | 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) 802.11ax: OFDMA (BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM) |
| Antenna Type / Gain | PIFA Antenna with gain -3.00 dBi |

Note:

1. For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11ac VHT20/VHT40 by referring to their maximum conducted power.
2. The device support partial RU for 802.11ax mode.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Testing Location

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

| | | | |
|---------------------------|---|----------------------------|---------------------------------------|
| Test Firm | Sporton International Inc. (Shenzhen) | | |
| Test Site Location | 1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595 | | |
| Test Site No. | Sporton Site No. | FCC Designation No. | FCC Test Firm Registration No. |
| | CO01-SZ TH01-SZ | CN1256 | 421272 |

| | | | |
|---------------------------|---|----------------------------|---------------------------------------|
| Test Firm | Sporton International Inc. (Shenzhen) | | |
| Test Site Location | 101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398 | | |
| Test Site No. | Sporton Site No. | FCC Designation No. | FCC Test Firm Registration No. |
| | 03CH01-SZ | CN1256 | 421272 |

1.7 Test Software

| Item | Site | Manufacturer | Name | Version |
|------|-----------|--------------|------|-------------|
| 1. | 03CH01-SZ | AUDIX | E3 | 6.2009-8-24 |
| 2. | CO01-SZ | AUDIX | E3 | 6.120613b |

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

| Frequency Band | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|--------------------------|---------|-------------|---------|-------------|
| 5745-5825 MHz U-NII-3 | 149 | 5745 | 157 | 5785 |
| | 151* | 5755 | 159* | 5795 |
| | 153 | 5765 | 161 | 5805 |
| | 155# | 5775 | 165 | 5825 |

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#n" were 802.11ac VHT80.



2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

MIMO Mode

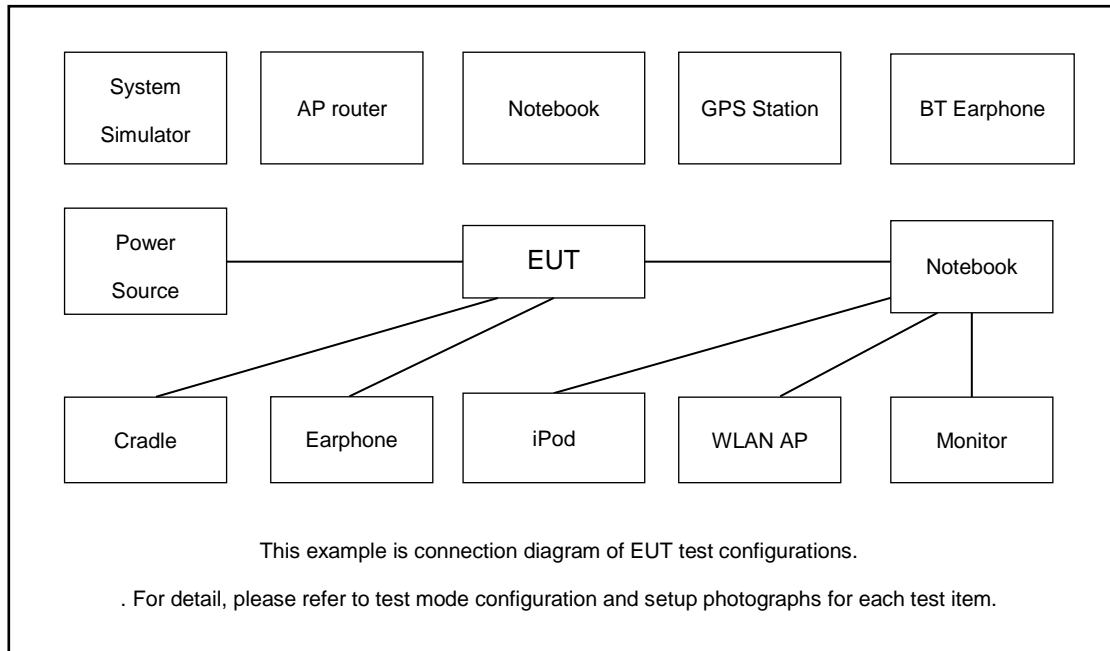
| Modulation | Data Rate |
|----------------------------------|-----------|
| 802.11a | 6 Mbps |
| 802.11n HT20 | MCS0 |
| 802.11n HT40 | MCS0 |
| 802.11ac VHT20 (Covered by HT20) | MCS0 |
| 802.11ac VHT40 (Covered by HT40) | MCS0 |
| 802.11ac VHT80 | MCS0 |
| 802.11ax HE20 | MCS0 |
| 802.11ax HE40 | MCS0 |
| 802.11ax HE80 | MCS0 |

| | |
|--------------------------------------|--|
| AC Conducted Emission | Mode 1 : GSM 850 Idle + Bluetooth Link + WLAN Link(5G) + USB Cable (Charging from Adapter) + Battery |
|--------------------------------------|--|

| Ch. # | | U-NII-3 : 5745-5825 MHz | | | |
|-------|--------|-------------------------|--------------|--------------|----------------|
| | | 802.11a | 802.11n HT20 | 802.11n HT40 | 802.11ac VHT80 |
| L | Low | 149 | 149 | 151 | - |
| M | Middle | 157 | 157 | - | 155 |
| H | High | 165 | 165 | 159 | - |

| Ch. # | | Band IV : 5725-5850 MHz | | |
|-------|--------|-------------------------|---------------|---------------|
| | | 802.11ax HE20 | 802.11ax HE40 | 802.11ax HE80 |
| L | Low | 149 | 151 | - |
| M | Middle | 157 | - | 155 |
| H | High | 165 | 159 | - |

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|------|-------------------|------------|------------|-------------|------------|------------------|
| 1. | Base Station(LTE) | Anritsu | MT8820C | N/A | N/A | Unshielded, 1.8m |
| 2. | WLAN AP | Dlink | DIR-820L | KA2IR820LA1 | N/A | Unshielded, 1.8m |



2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 2.8 dB and 10 dB attenuator.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 2.8 + 10 = 12.8 \text{ (dB)} \end{aligned}$$

3 Test Result

3.1 6dB and 26dB and 99% Occupied Bandwidth Measurement

3.1.1 Description of 6dB and 26dB and 99% Occupied Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

26dB and 99% Occupied bandwidth are reporting only.

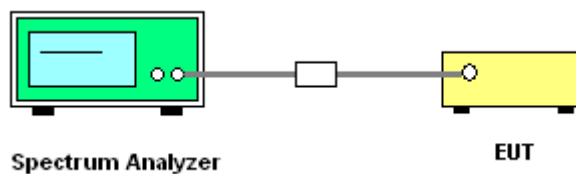
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth for the band 5.725-5.85GHz
2. For 6dB BW, Set RBW = 100kHz.
For 26dB BW, Set RBW = approximately 1% of the emission bandwidth.
For 99% OBW, Set RBW = 1% to 5% of the OBW.
3. For 26dB BW, Set the VBW > RBW.
For 6dB BW & 99% OBW, Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

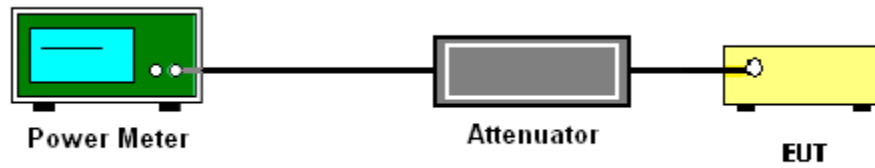
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.
4. For MIMO mode, the measure-and-sum technique should be used for measuring the in-band transmit power of a device.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section F) Maximum power spectral density.

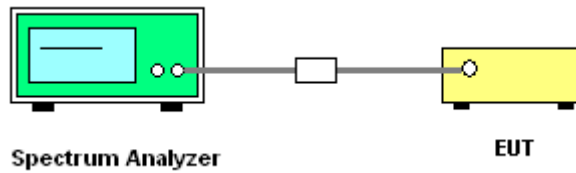
Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz.
- Set VBW \geq 1 MHz.
- Number of points in sweep \geq 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add $10 \log(500\text{kHz}/\text{RBW})$ to the test result.
- Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.

1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.

3.4 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5.725-5.85 GHz band:

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009 – 0.490 | 2400/F(kHz) | 300 |
| 0.490 – 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30.0 | 30 | 30 |
| 30 – 88 | 100 | 3 |
| 88 – 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

| EIRP (dBm) | Field Strength at 3m (dBµV/m) |
|------------|-------------------------------|
| - 27 | 68.3 |

Note: The following formula is used to convert the EIRP to field strength.

$$EIRP = E_{Meas} + 20\log(d_{Meas}) - 104.7$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBµV/m

d_{Meas} is the measurement distance, in m

(3) ANSI C63.10-2013 clause 12.7.3 note 97

As specified by regulatory requirements, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit. However, an out-of-band emission that



complies with both the average and peak general regulatory limits is not required to satisfy the peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

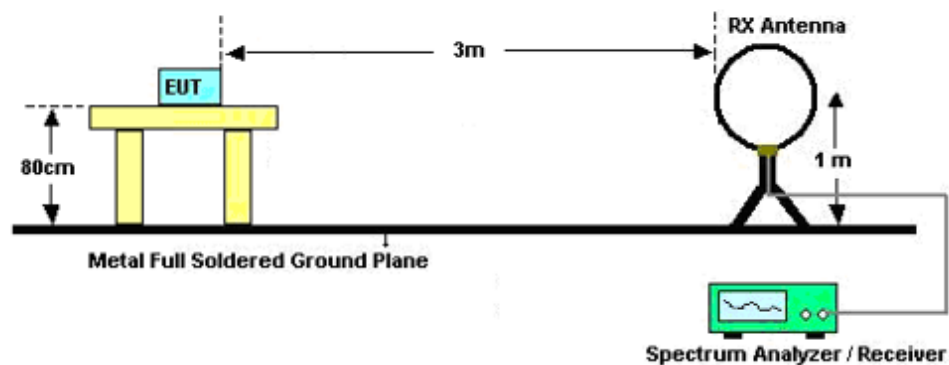
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW \geq 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the

limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.

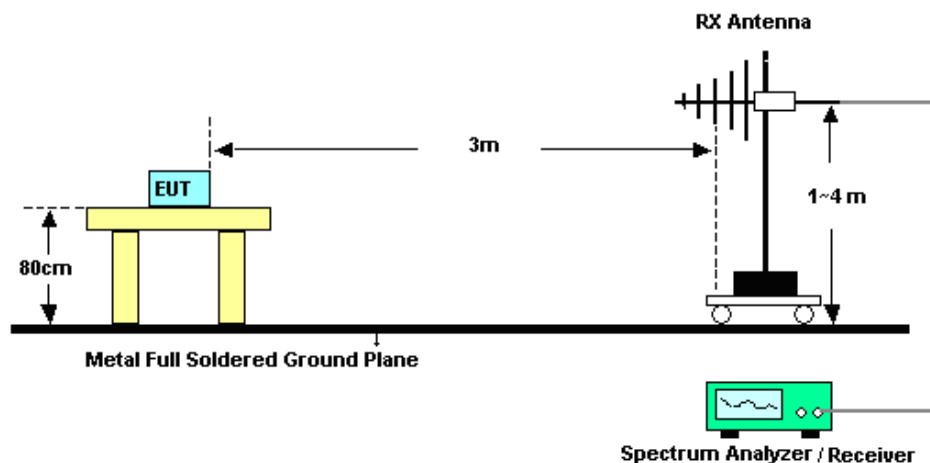
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

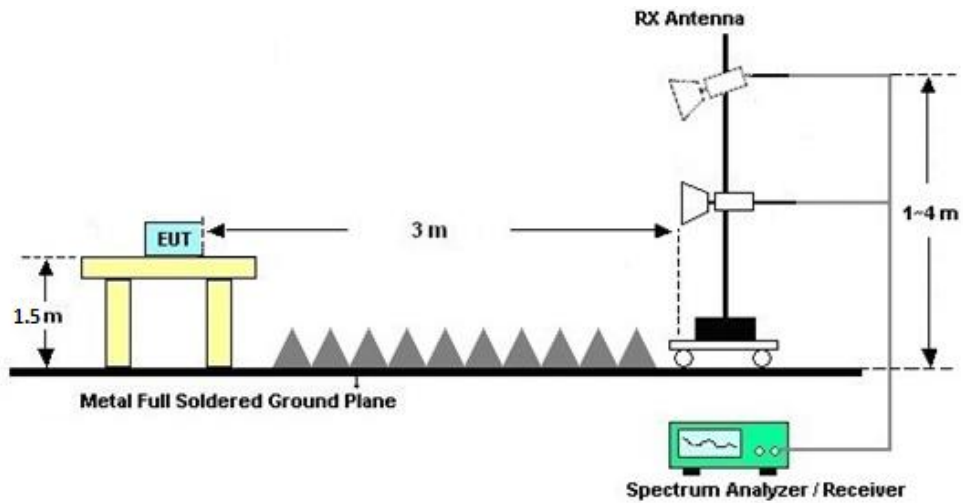
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix C.

3.4.7 Duty Cycle

Please refer to Appendix D.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic or 40GHz, whichever is lower)

Please refer to Appendix C.



3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dBµV) | |
|-----------------------------|------------------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

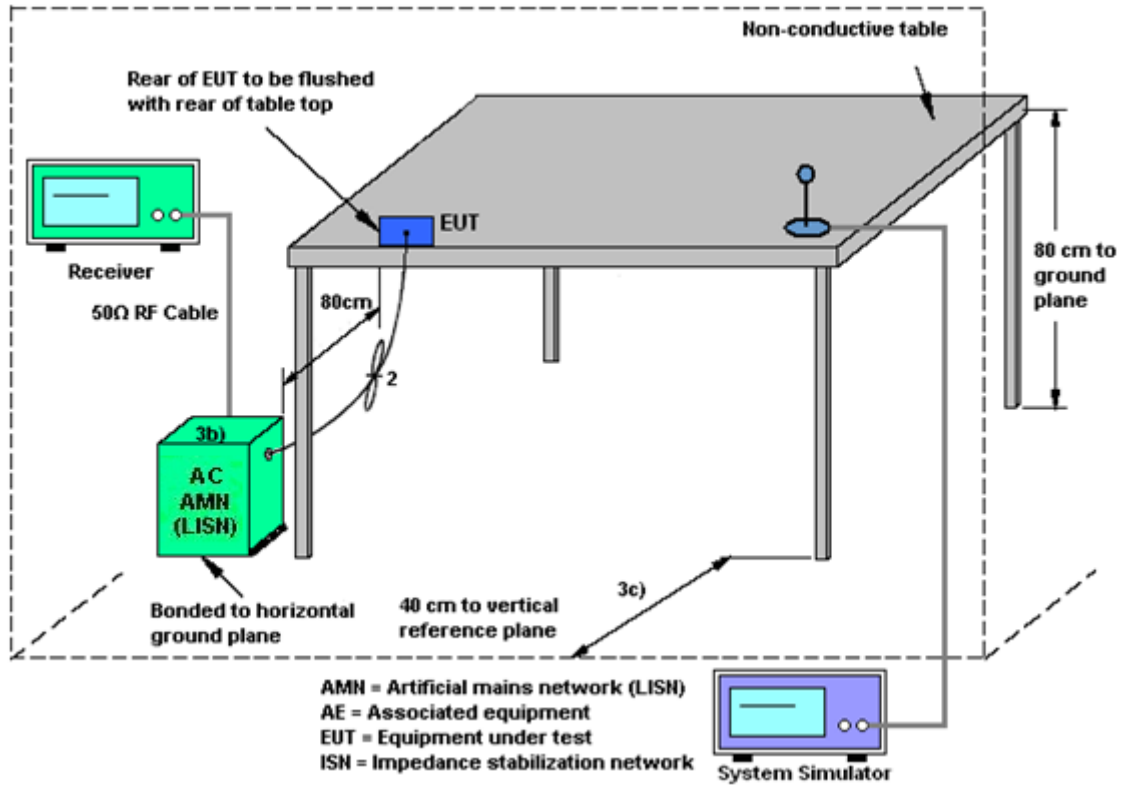
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.5.4 Test Setup



3.5.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.6 Antenna Requirements

3.6.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-----------------------------------|---------------------------|----------------------------------|--------------|-----------------|------------------|---------------------------------|---------------|-----------------------|
| Spectrum Analyzer | R&S | FSV40 | 101078 | 10Hz~40GHz | Apr. 07, 2022 | Jul. 11, 2022~ Jul. 13, 2022 | Apr. 08, 2023 | Conducted (TH01-SZ) |
| Pulse Power Sensor | Anritsu | MA2411B | 1339473 | 30MHz~40GHz | Dec. 28, 2021 | Jul. 11, 2022~ Jul. 13, 2022 | Dec. 27, 2022 | Conducted (TH01-SZ) |
| Power Meter | Anritsu | ML2495A | 1542004 | 50MHz Bandwidth | Dec. 28, 2021 | Jul. 11, 2022~ Jul. 13, 2022 | Dec. 27, 2022 | Conducted (TH01-SZ) |
| DC Power Supply | TTI | PL330P | 290070 | Max 32V , 3A | Oct. 25, 2021 | Jul. 11, 2022~ Jul. 13, 2022 | Oct. 24, 2022 | Conducted (TH01-SZ) |
| Thermal Chamber | Ten Billion Hongzhangroup | LP-150U | H2014081803 | -40~+150°C | Jul. 07, 2022 | Jul. 11, 2022~ Jul. 13, 2022 | Jul. 06, 2023 | Conducted (TH01-SZ) |
| EMI Receiver | R&S | ESR7 | 101630 | 9kHz~7GHz; | Sep. 01, 2021 | Jul. 15, 2022 | Aug. 31, 2022 | Conduction (CO01-SZ) |
| AC LISN | R&S | ENV216 | 100063 | 9kHz~30MHz | Sep. 01, 2021 | Jul. 15, 2022 | Aug. 31, 2022 | Conduction (CO01-SZ) |
| AC LISN (for auxiliary equipment) | EMCO | 3816/2SH | 00103892 | 9kHz~30MHz | Oct. 29, 2021 | Jul. 15, 2022 | Oct. 28, 2022 | Conduction (CO01-SZ) |
| AC Power Source | Chroma | 61602 | 616020000891 | 100Vac~250Vac | Jul. 07, 2022 | Jul. 15, 2022 | Jul. 06, 2023 | Conduction (CO01-SZ) |
| EMI Test Receiver&SA | Agilent | N9038A | MY52260185 | 20Hz~26.5GHz | Dec. 27, 2021 | Jul. 15, 2022 | Dec. 26, 2022 | Radiation (03CH01-SZ) |
| EXA Spectrum Analyzer | KEYSIGHT | N9010A | MY55150213 | 10Hz~44GHz | Jul. 06, 2022 | Jul. 15, 2022 | Jul. 05, 2023 | Radiation (03CH01-SZ) |
| Loop Antenna | R&S | HFH2-Z2 | 100354 | 9kHz~30MHz | Jul. 17, 2020 | Jul. 15, 2022 | Jul. 16, 2022 | Radiation (03CH01-SZ) |
| Bilog Antenna | TeseQ | CBL6112D | 35407 | 30MHz-2GHz | Sep. 28, 2021 | Jul. 15, 2022 | Sep. 27, 2022 | Radiation (03CH01-SZ) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117 | 00119436 | 1GHz~18GHz | Jul. 07, 2022 | Jul. 15, 2022 | Jul. 06, 2023 | Radiation (03CH01-SZ) |
| SHF-EHF Horn | com-power | AH-840 | 101071 | 18Ghz-40GHz | Apr. 10, 2022 | Jul. 15, 2022 | Apr. 09, 2023 | Radiation (03CH01-SZ) |
| LF Amplifier | Burgeon | BPA-530 | 102209 | 0.01~3000Mhz | Apr. 06, 2022 | Jul. 15, 2022 | Apr. 05, 2023 | Radiation (03CH01-SZ) |
| HF Amplifier | MITEQ | AMF-7D-00 101800-30- 10P-R | 1943528 | 1GHz~18GHz | Oct. 22, 2021 | Jul. 15, 2022 | Oct. 21, 2022 | Radiation (03CH01-SZ) |
| HF Amplifier | KEYSIGHT | 83017A | MY53270105 | 0.5GHz~26.5Ghz | Oct. 22, 2021 | Jul. 15, 2022 | Oct. 21, 2022 | Radiation (03CH01-SZ) |
| HF Amplifier | MITEQ | TTA1840-3 5-HG | 1871923 | 18GHz~40GHz | Jul. 06, 2022 | Jul. 15, 2022 | Jul. 05, 2023 | Radiation (03CH01-SZ) |
| AC Power Source | Chroma | 61601 | 616010001985 | N/A | NCR | Jul. 15, 2022 | NCR | Radiation (03CH01-SZ) |
| Turn Table | EM | EM1000 | N/A | 0~360 degree | NCR | Jul. 15, 2022 | NCR | Radiation (03CH01-SZ) |
| Antenna Mast | EM | EM1000 | N/A | 1 m~4 m | NCR | Jul. 15, 2022 | NCR | Radiation (03CH01-SZ) |

NCR: No Calibration Required



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

| | |
|---|--------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 2.2 dB |
|---|--------|

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|--------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 4.2 dB |
|---|--------|

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

| | |
|---|--------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 5.0 dB |
|---|--------|

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

| | |
|---|--------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 4.3 dB |
|---|--------|

----- THE END -----



Appendix A. Conducted Test Results



| | |
|--|------------------------------|
| Ambient Condition: <u>25</u> °C, <u>45</u> %RH | |
| According Standard: <u>■Part15E</u> | |
| Test Date: <u>2022/7/11~2022/7/13</u> | Test Engineer: <u>Ma Jie</u> |

Emission Bandwidth

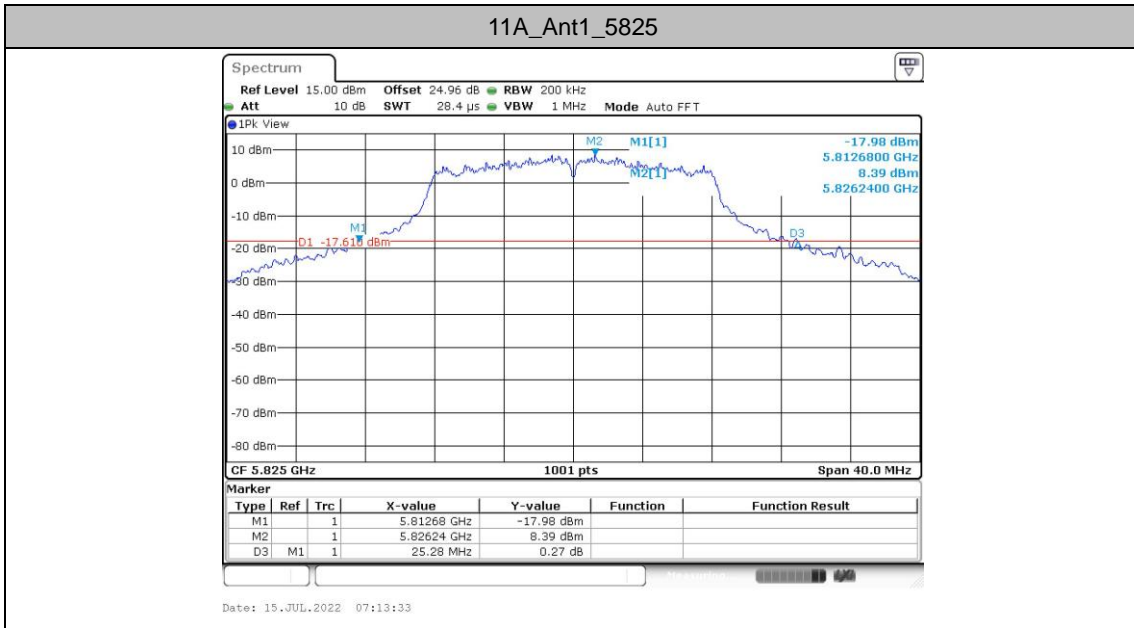
Test Result

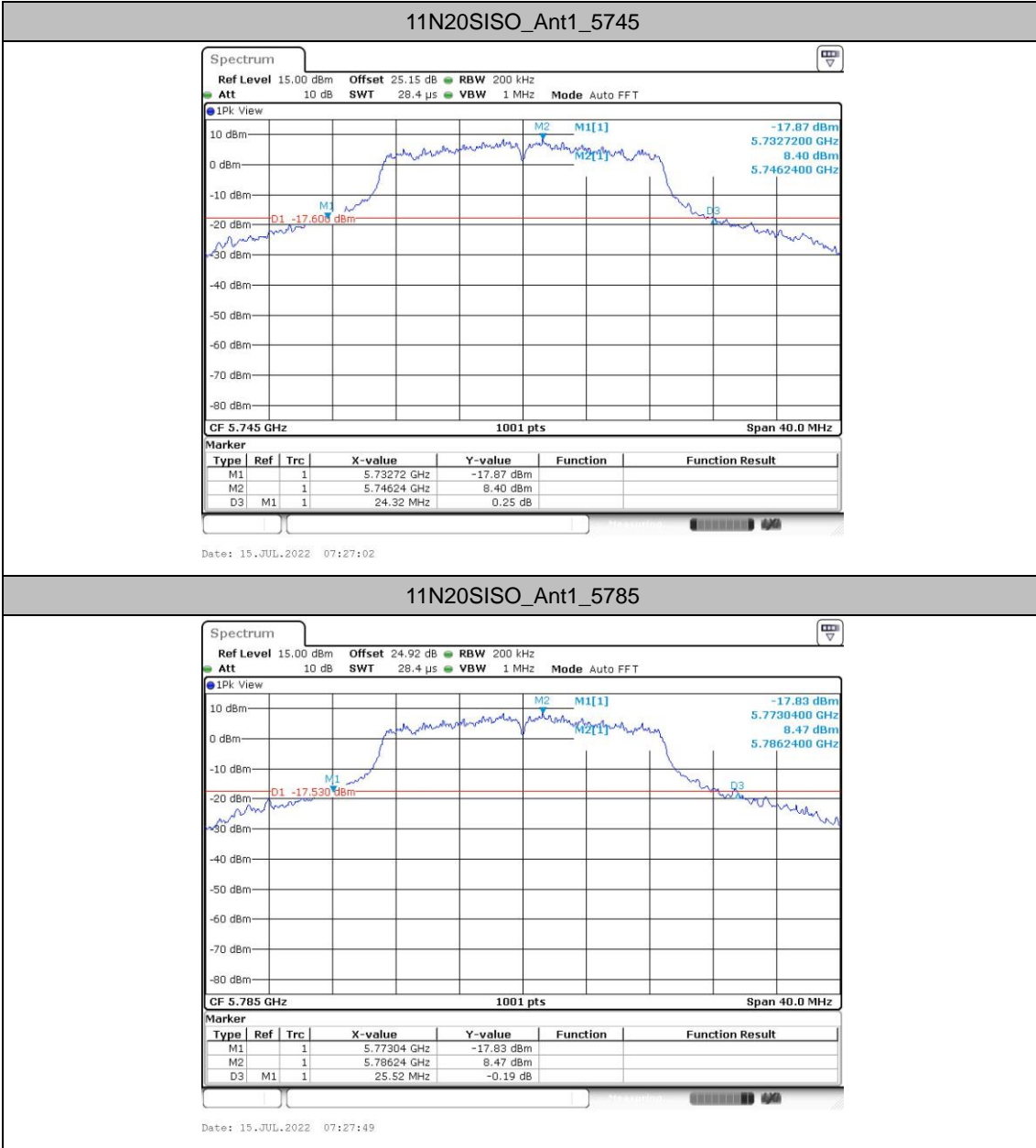
| TestMode | Antenna | Freq(MHz) | 26dB EBW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|------------|---------|-----------|----------------|---------|---------|------------|---------|
| 11A | Ant1 | 5745 | 24.68 | 5732.72 | 5757.40 | --- | --- |
| | | 5785 | 24.32 | 5772.68 | 5797.00 | --- | --- |
| | | 5825 | 25.28 | 5812.68 | 5837.96 | --- | --- |
| 11N20SISO | Ant1 | 5745 | 24.32 | 5732.72 | 5757.04 | --- | --- |
| | | 5785 | 25.52 | 5773.04 | 5798.56 | --- | --- |
| | | 5825 | 25.52 | 5812.56 | 5838.08 | --- | --- |
| 11N40SISO | Ant1 | 5755 | 42.48 | 5733.96 | 5776.44 | --- | --- |
| | | 5795 | 42.56 | 5773.96 | 5816.52 | --- | --- |
| 11AC80SISO | Ant1 | 5775 | 80.32 | 5734.68 | 5815.00 | --- | --- |
| 11AX20SISO | Ant1 | 5745 | 21.72 | 5734.44 | 5756.16 | --- | --- |
| | | 5785 | 21.76 | 5774.16 | 5795.92 | --- | --- |
| | | 5825 | 21.48 | 5814.16 | 5835.64 | --- | --- |
| 11AX40SISO | Ant1 | 5755 | 39.84 | 5735.16 | 5775.00 | --- | --- |
| | | 5795 | 39.84 | 5775.08 | 5814.92 | --- | --- |
| 11AX80SISO | Ant1 | 5775 | 80.64 | 5734.68 | 5815.32 | --- | --- |

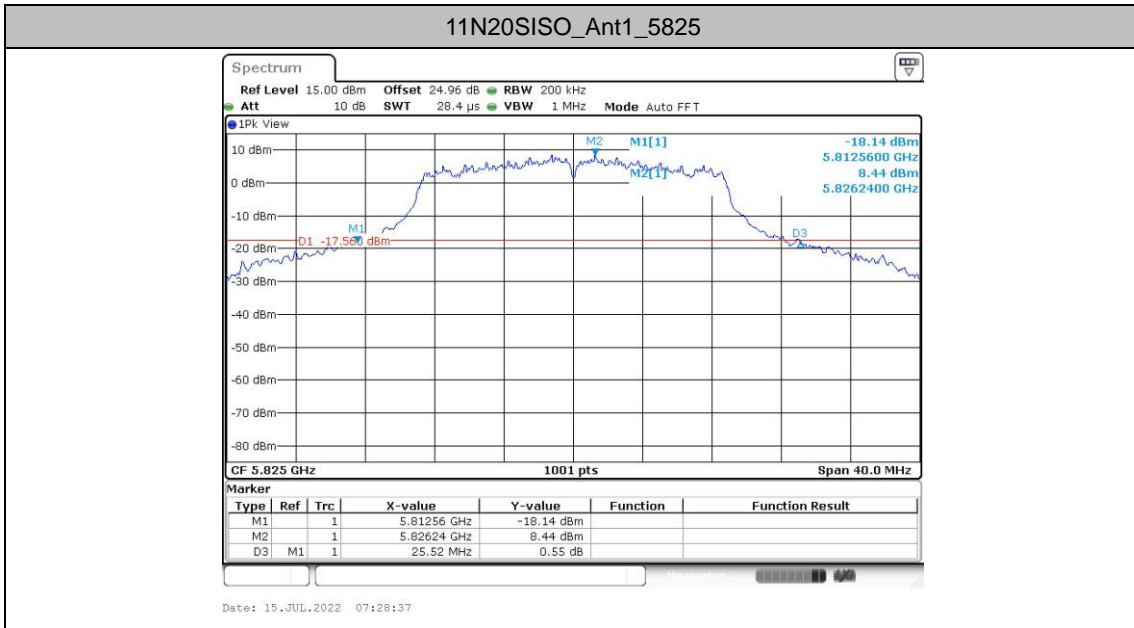


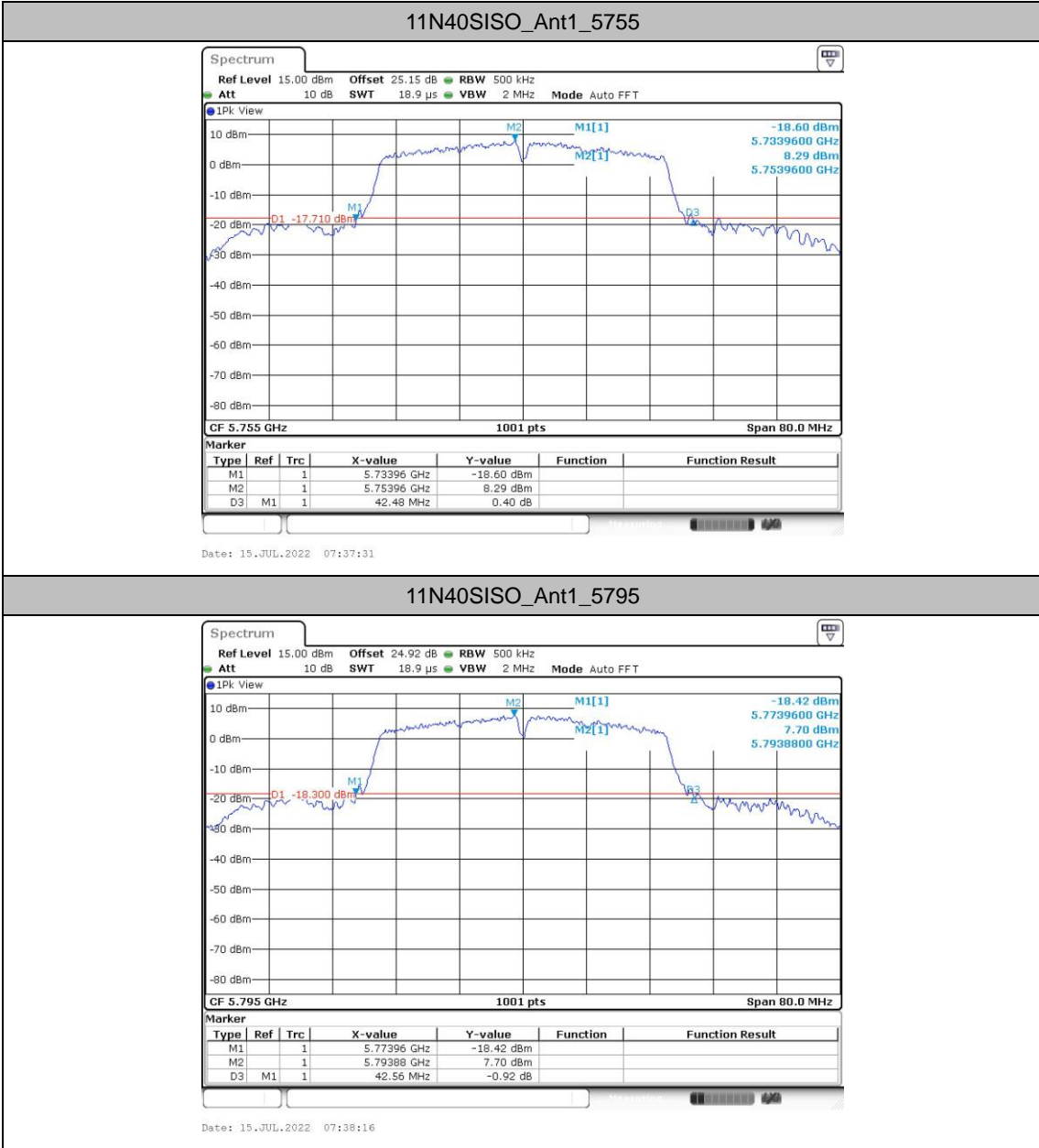
Test Graphs

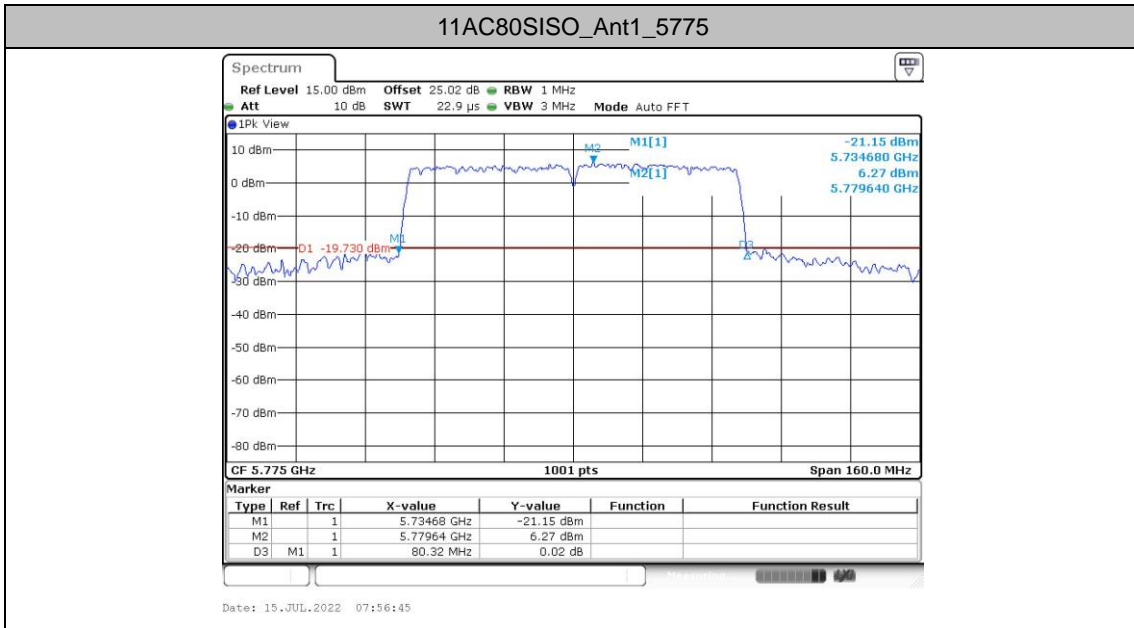


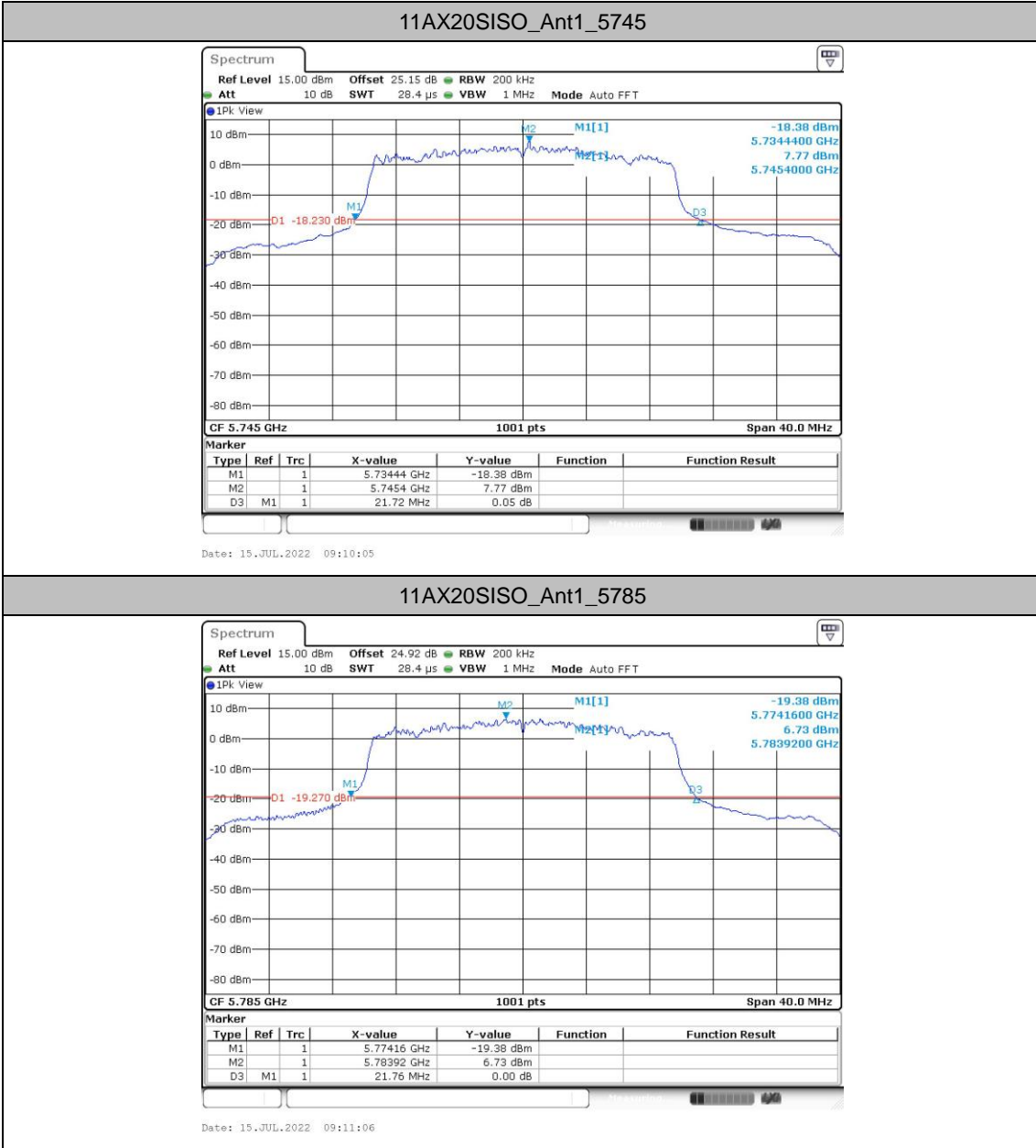


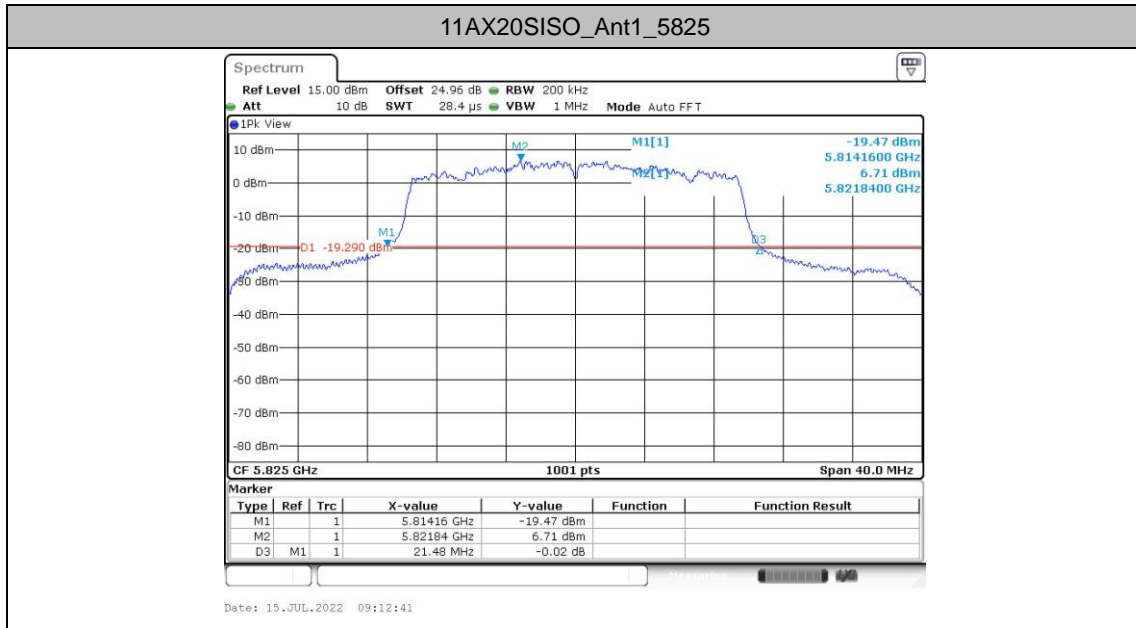


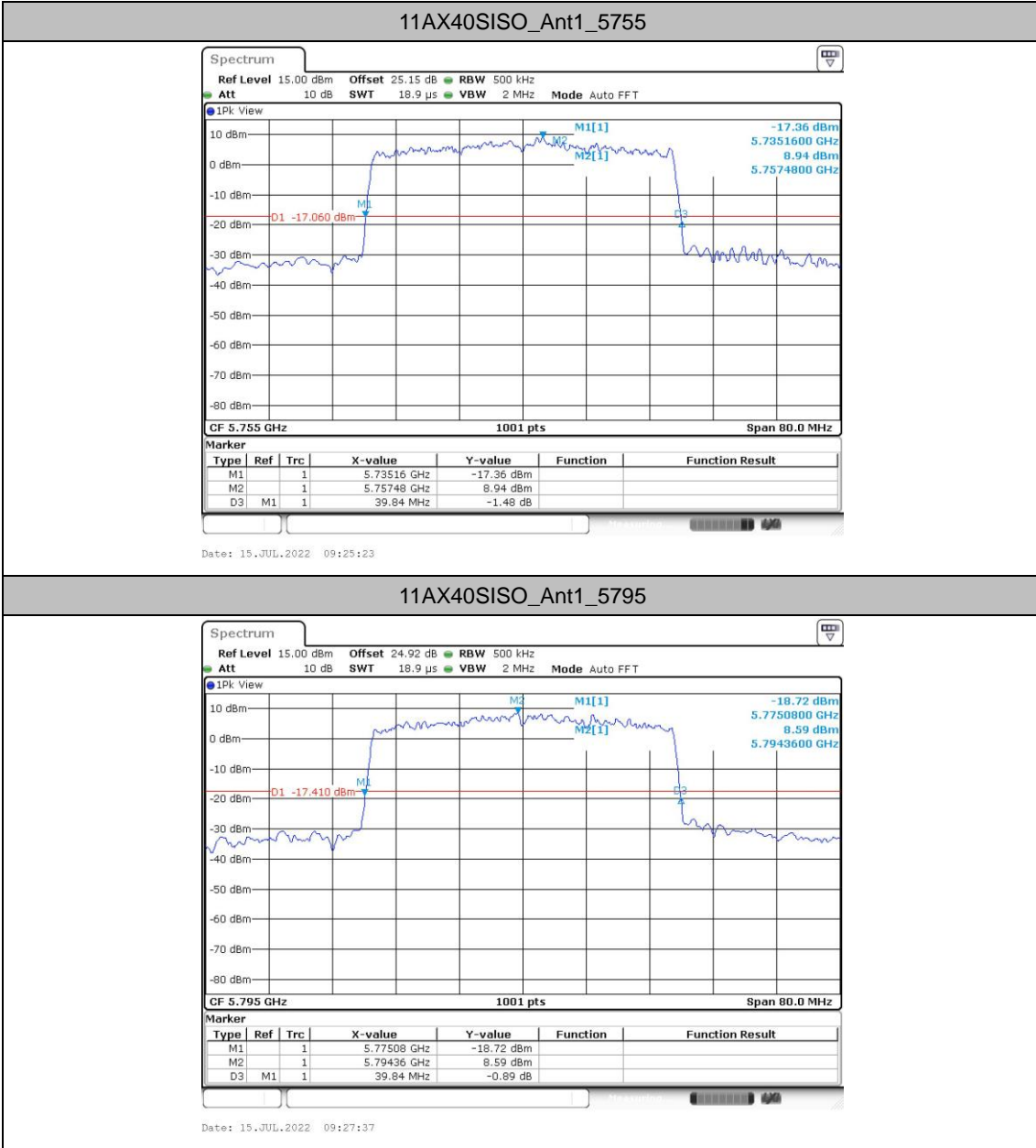


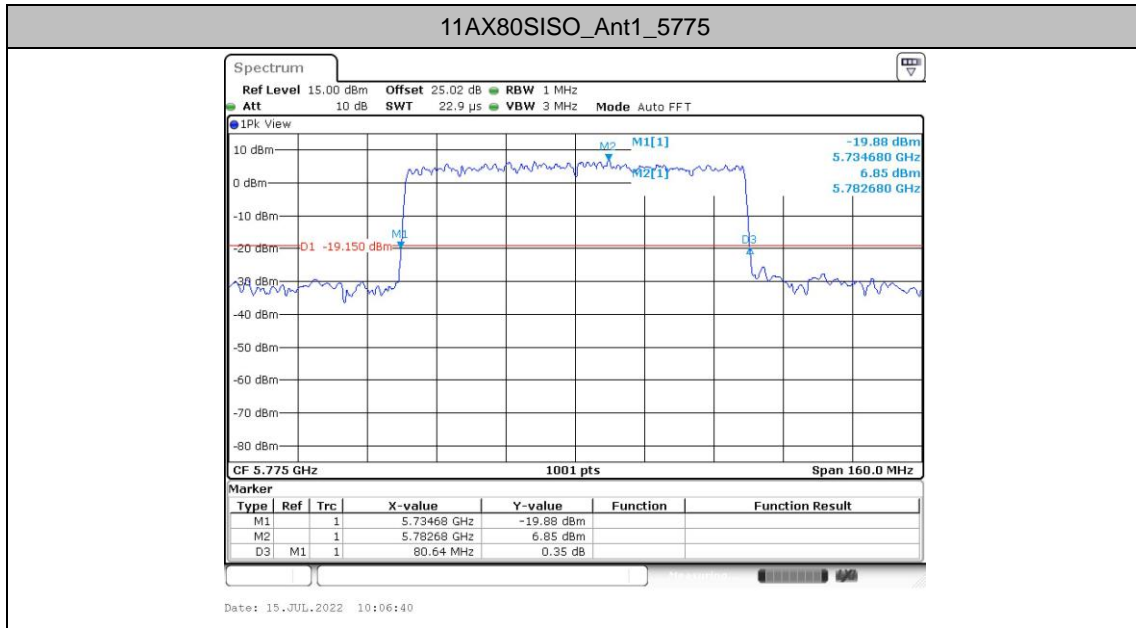














Appendix A2: Occupied channel bandwidth

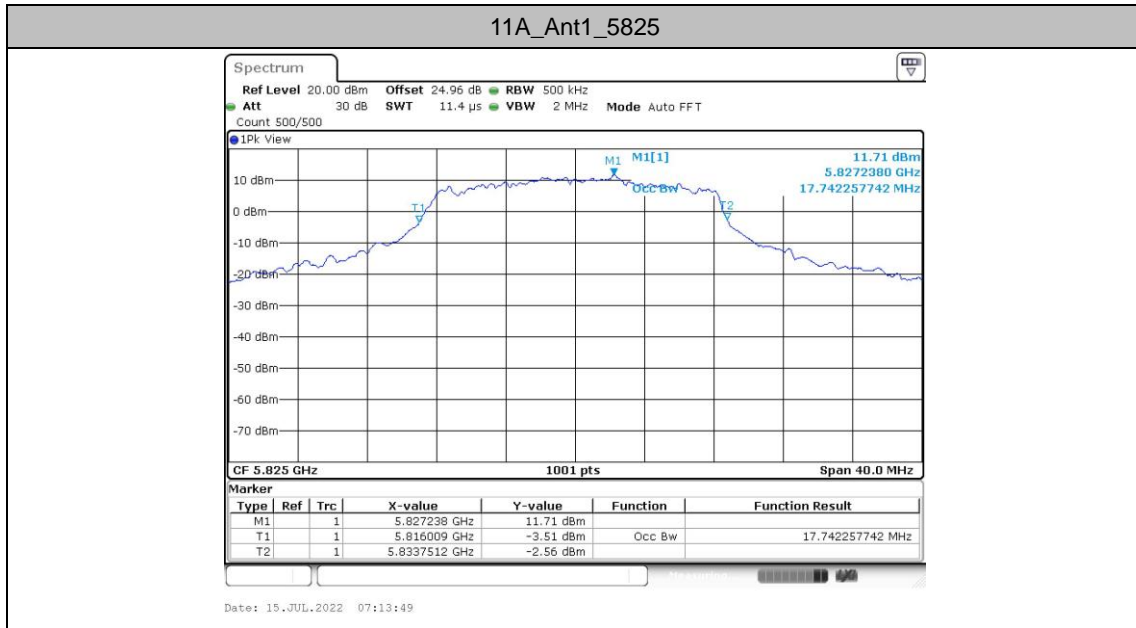
Test Result

| TestMode | Antenna | Freq(MHz) | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|------------|---------|-----------|-----------|----------|----------|------------|---------|
| 11A | Ant1 | 5745 | 17.942 | 5736.049 | 5753.991 | --- | --- |
| | | 5785 | 18.422 | 5775.889 | 5794.311 | --- | --- |
| | | 5825 | 17.742 | 5816.009 | 5833.751 | --- | --- |
| 11N20SISO | Ant1 | 5745 | 19.061 | 5735.649 | 5754.710 | --- | --- |
| | | 5785 | 18.821 | 5775.689 | 5794.510 | --- | --- |
| | | 5825 | 19.341 | 5815.090 | 5834.431 | --- | --- |
| 11N40SISO | Ant1 | 5755 | 36.603 | 5736.618 | 5773.222 | --- | --- |
| | | 5795 | 36.444 | 5776.778 | 5813.222 | --- | --- |
| 11AC80SISO | Ant1 | 5775 | 76.404 | 5736.798 | 5813.202 | --- | --- |
| 11AX20SISO | Ant1 | 5745 | 19.061 | 5735.529 | 5754.590 | --- | --- |
| | | 5785 | 19.141 | 5775.450 | 5794.590 | --- | --- |
| | | 5825 | 19.221 | 5815.410 | 5834.630 | --- | --- |
| 11AX40SISO | Ant1 | 5755 | 37.642 | 5736.219 | 5773.861 | --- | --- |
| | | 5795 | 37.802 | 5776.059 | 5813.861 | --- | --- |
| 11AX80SISO | Ant1 | 5775 | 78.162 | 5735.999 | 5814.161 | --- | --- |



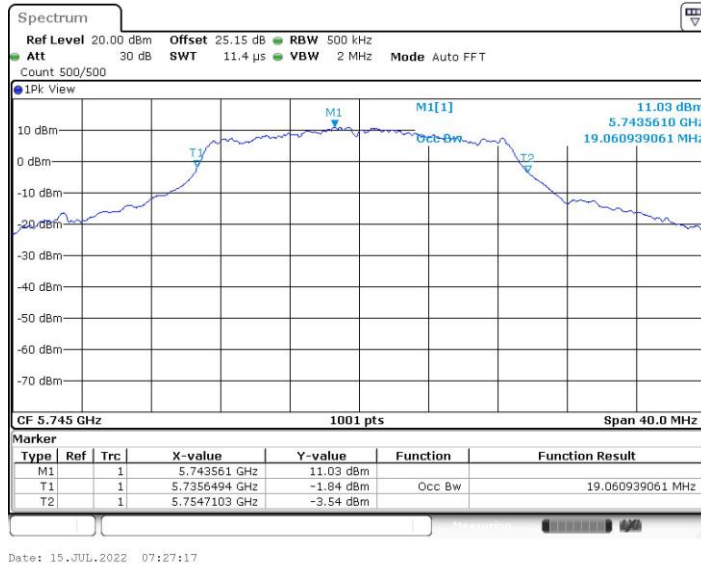
Test Graphs



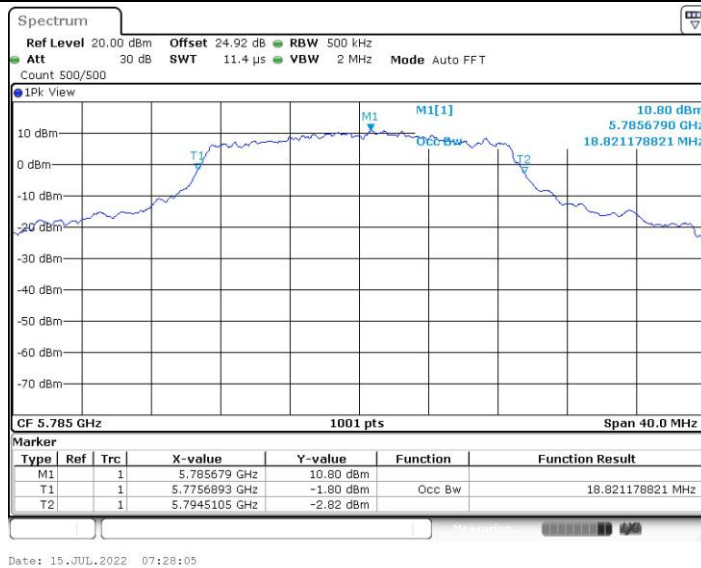




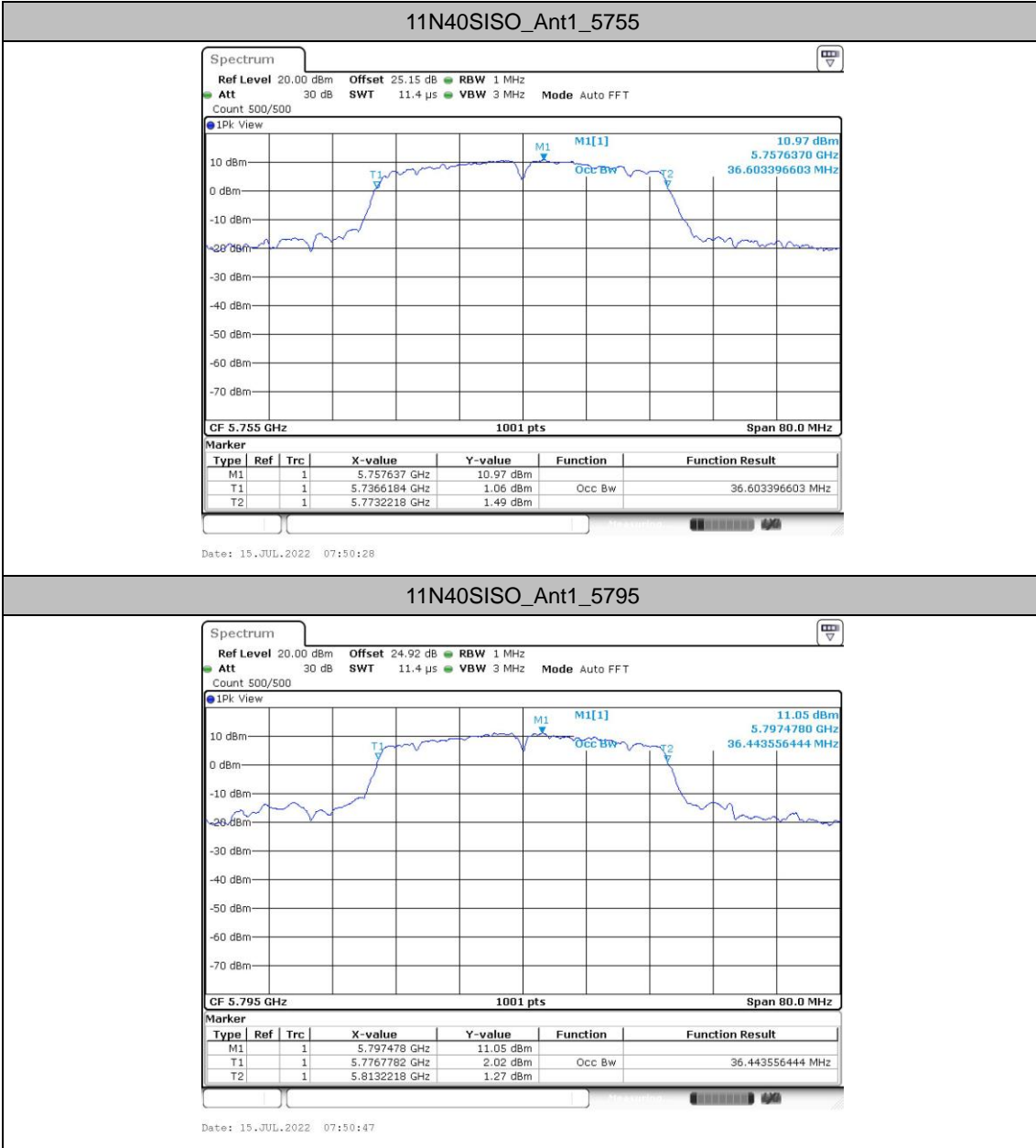
11N20SISO_Ant1_5745

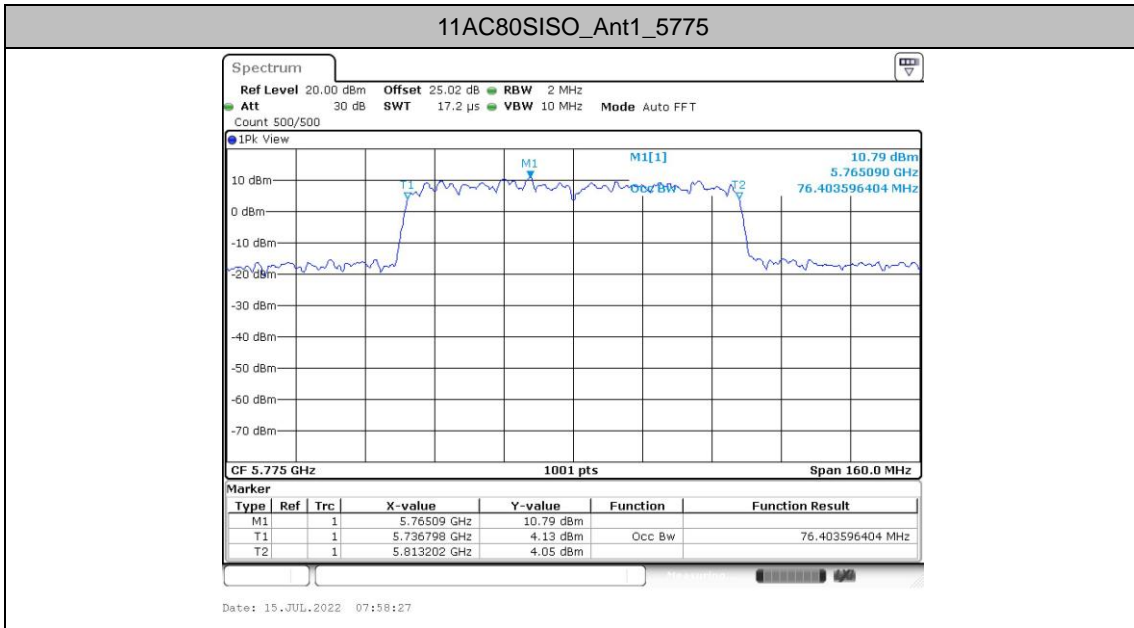


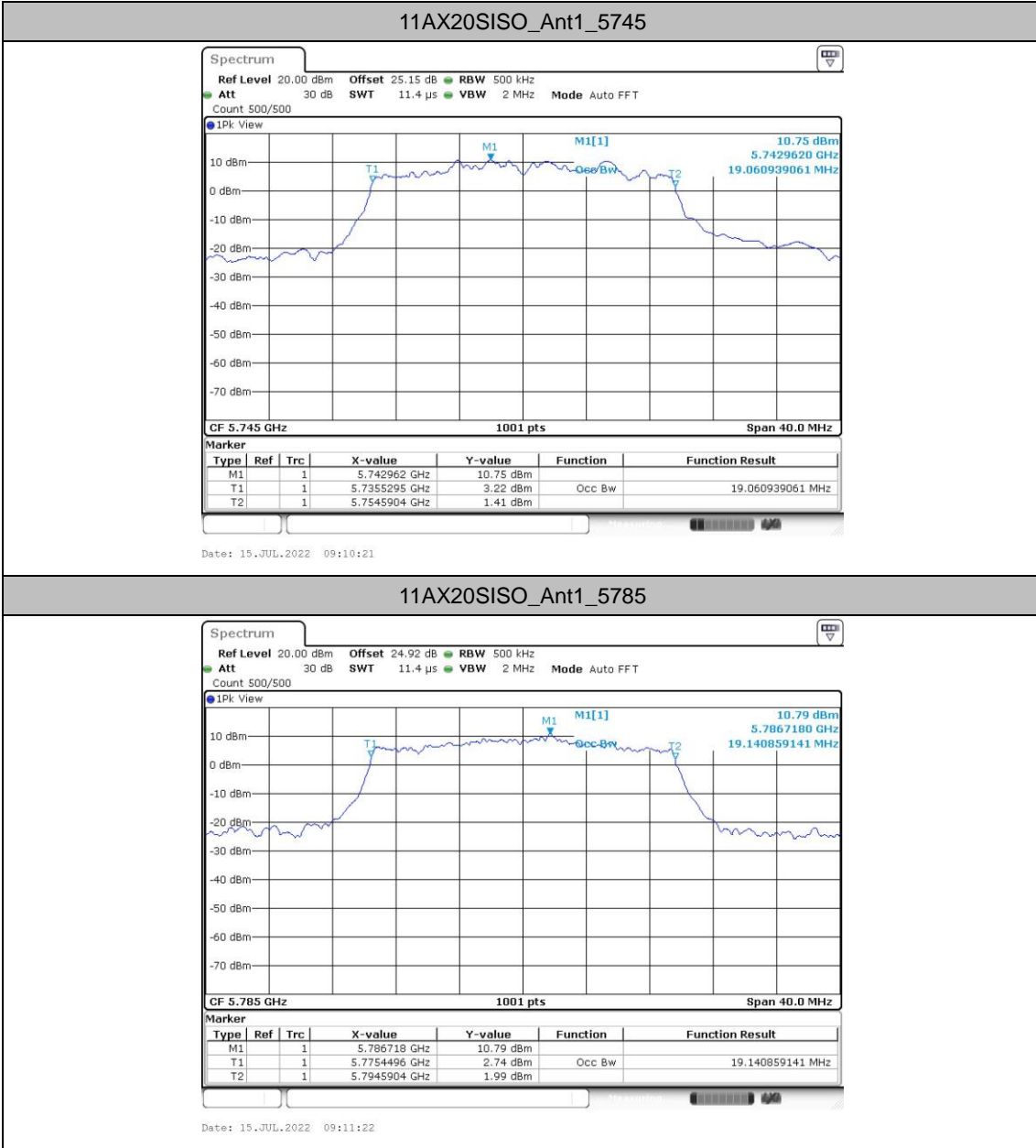
11N20SISO_Ant1_5785

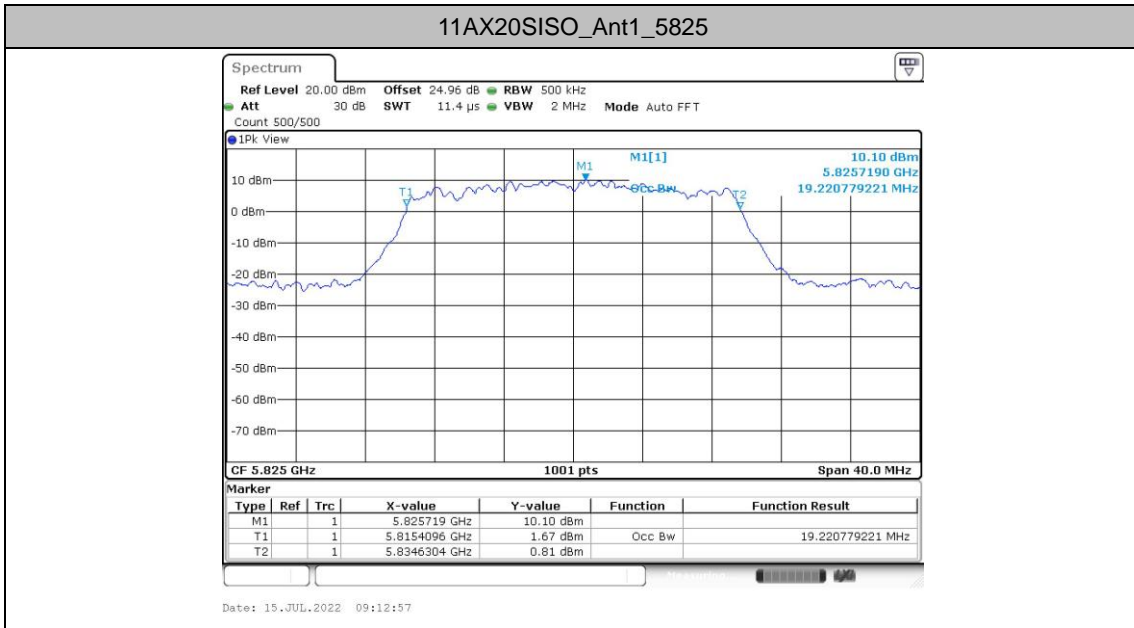


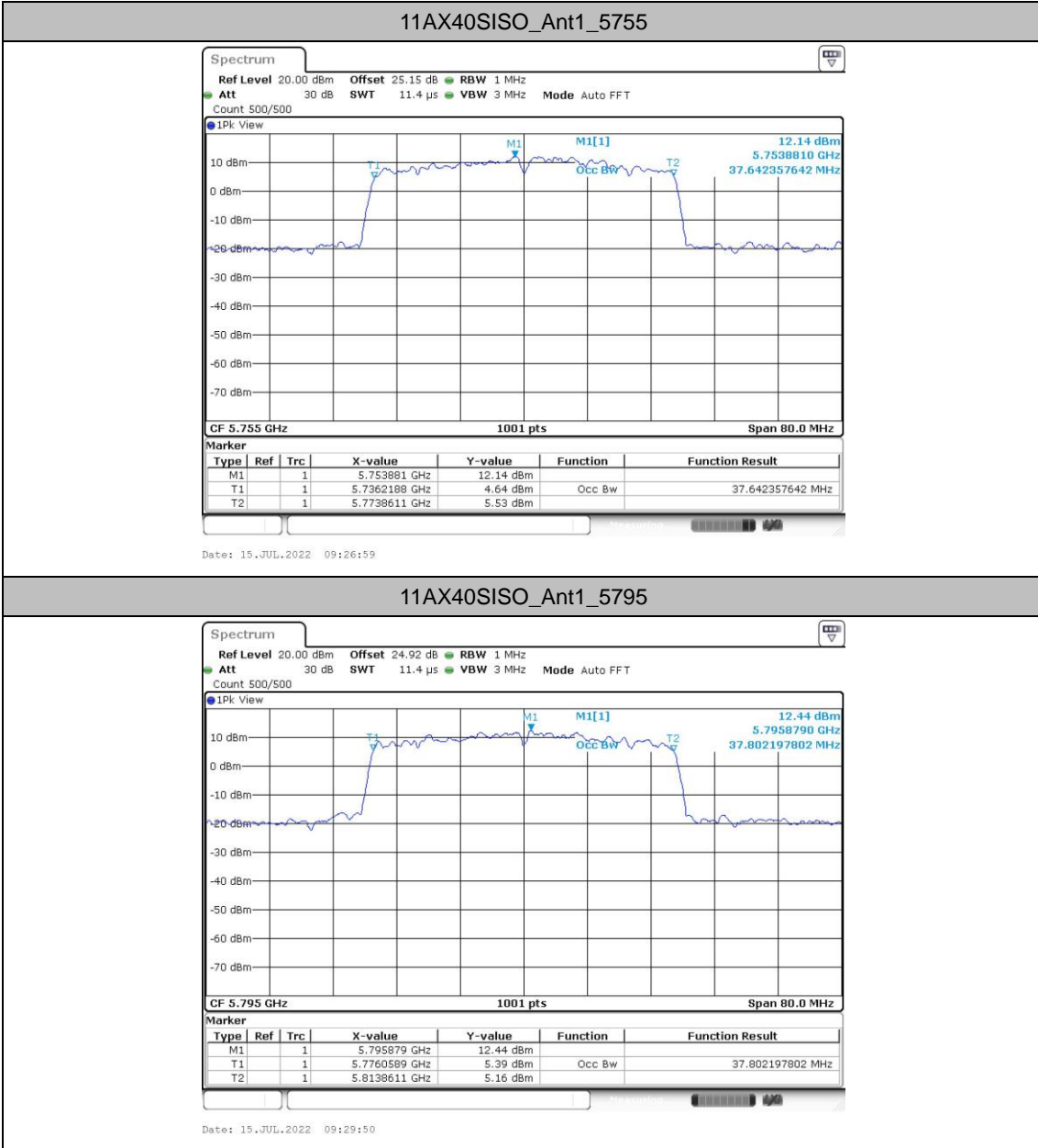


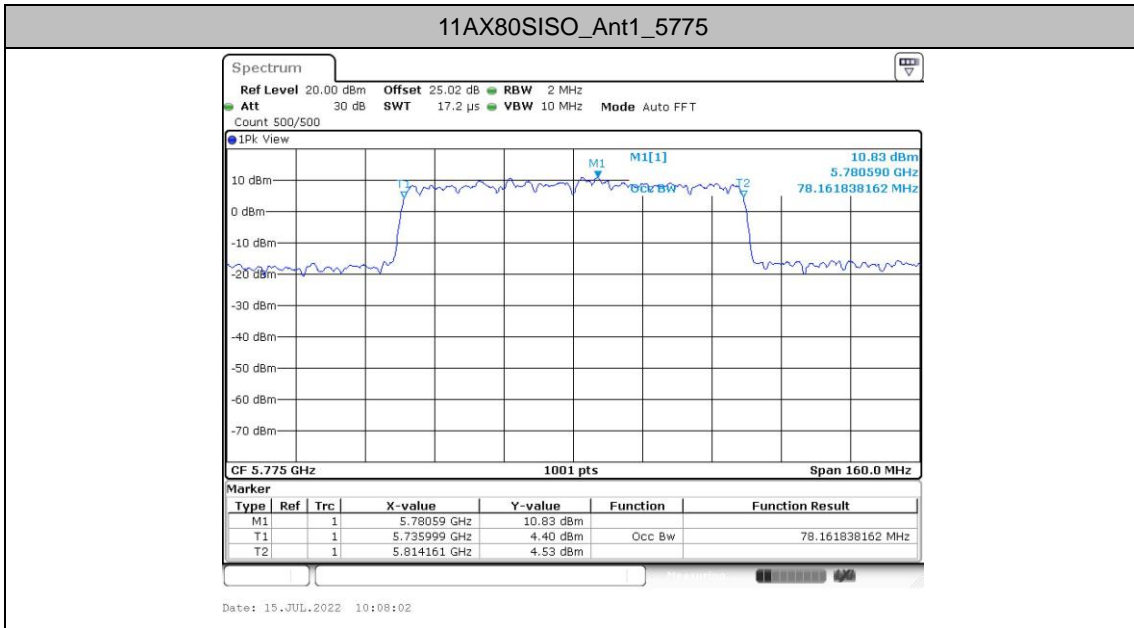














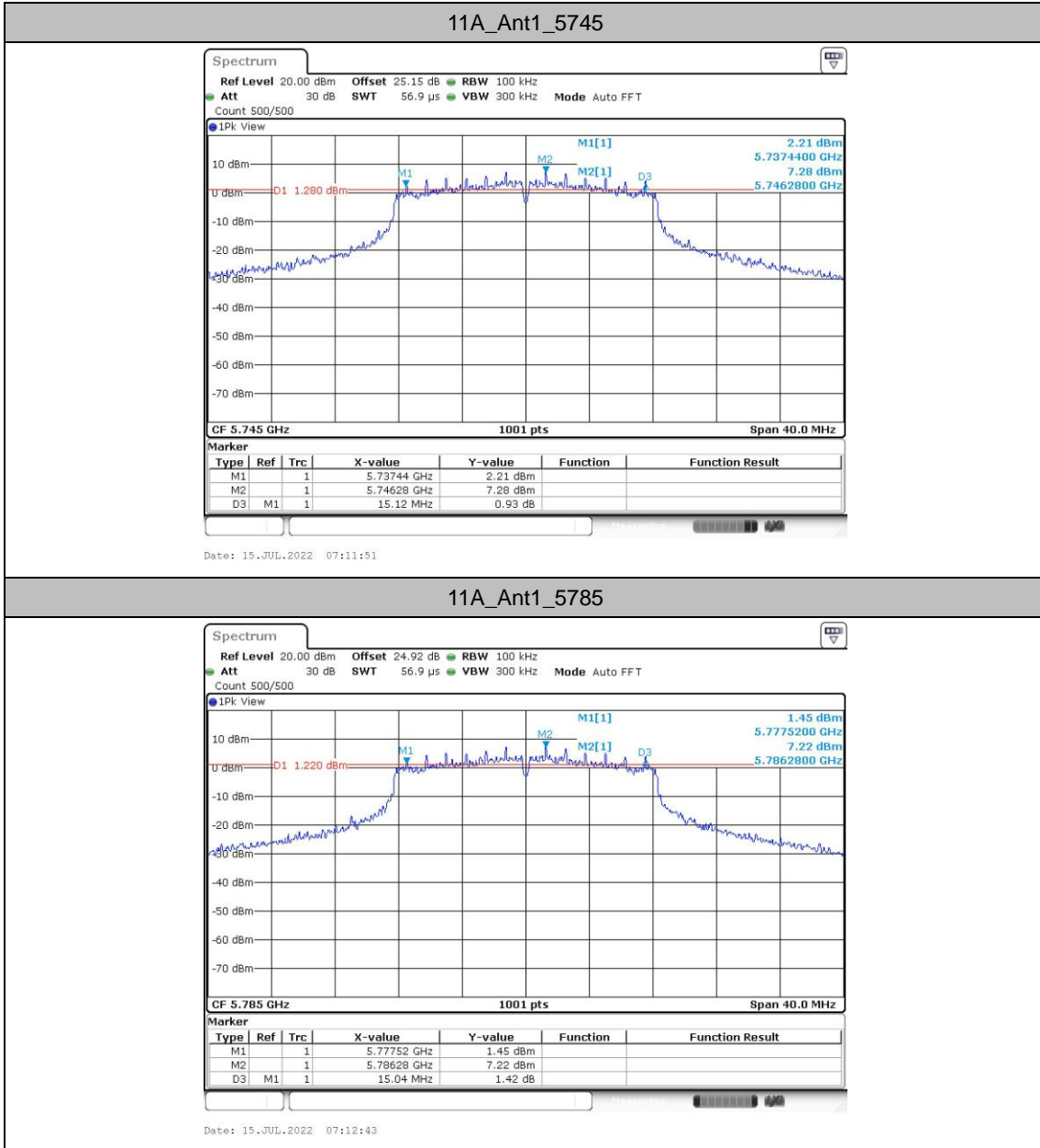
Min emission bandwidth

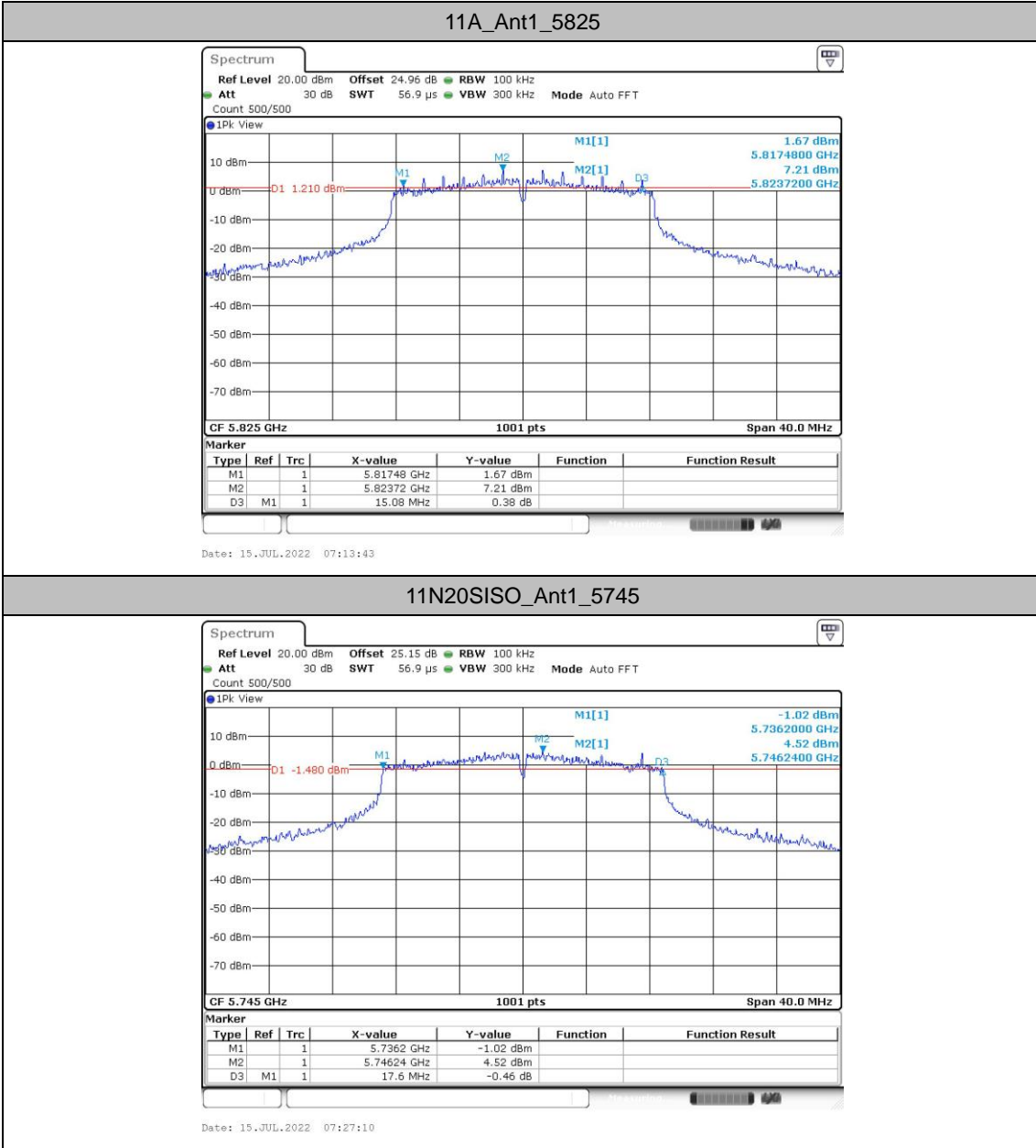
Test Result B4

| TestMode | Antenna | Freq(MHz) | 6dB EBW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|------------|---------|-----------|---------------|---------|---------|------------|---------|
| 11A | Ant1 | 5745 | 15.12 | 5737.44 | 5752.56 | 0.5 | PASS |
| | | 5785 | 15.04 | 5777.52 | 5792.56 | 0.5 | PASS |
| | | 5825 | 15.08 | 5817.48 | 5832.56 | 0.5 | PASS |
| 11N20SISO | Ant1 | 5745 | 17.60 | 5736.20 | 5753.80 | 0.5 | PASS |
| | | 5785 | 15.08 | 5777.44 | 5792.52 | 0.5 | PASS |
| | | 5825 | 17.32 | 5816.44 | 5833.76 | 0.5 | PASS |
| 11N40SISO | Ant1 | 5755 | 35.04 | 5737.48 | 5772.52 | 0.5 | PASS |
| | | 5795 | 35.04 | 5777.48 | 5812.52 | 0.5 | PASS |
| 11AC80SISO | Ant1 | 5775 | 75.84 | 5737.24 | 5813.08 | 0.5 | PASS |
| 11AX20SISO | Ant1 | 5745 | 16.08 | 5736.48 | 5752.56 | 0.5 | PASS |
| | | 5785 | 16.76 | 5776.24 | 5793.00 | 0.5 | PASS |
| | | 5825 | 16.68 | 5816.64 | 5833.32 | 0.5 | PASS |
| 11AX40SISO | Ant1 | 5755 | 36.16 | 5737.32 | 5773.48 | 0.5 | PASS |
| | | 5795 | 36.88 | 5776.68 | 5813.56 | 0.5 | PASS |
| 11AX80SISO | Ant1 | 5775 | 77.92 | 5736.12 | 5814.04 | 0.5 | PASS |



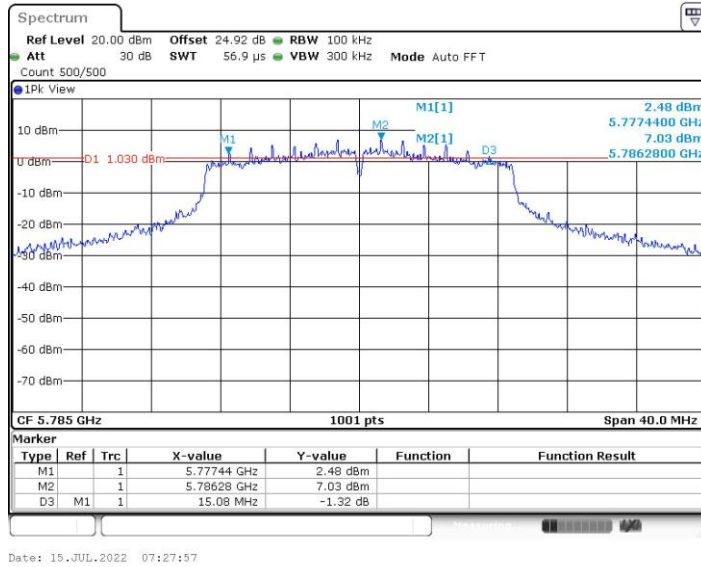
Test Graphs B4



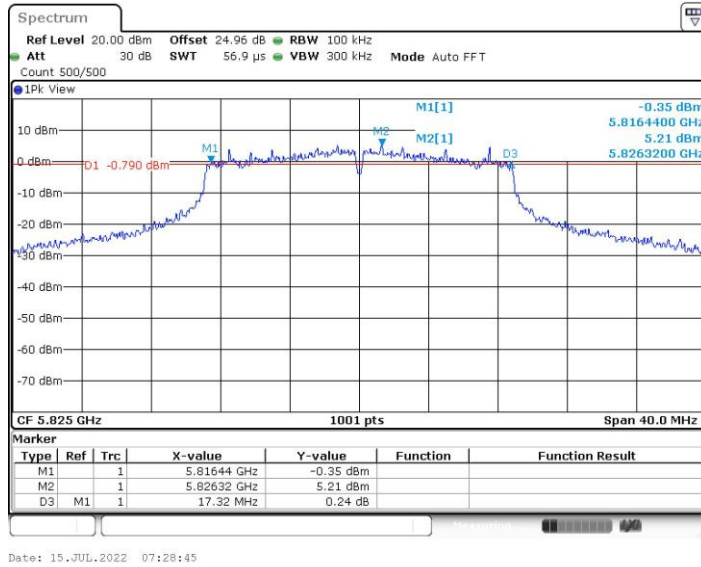


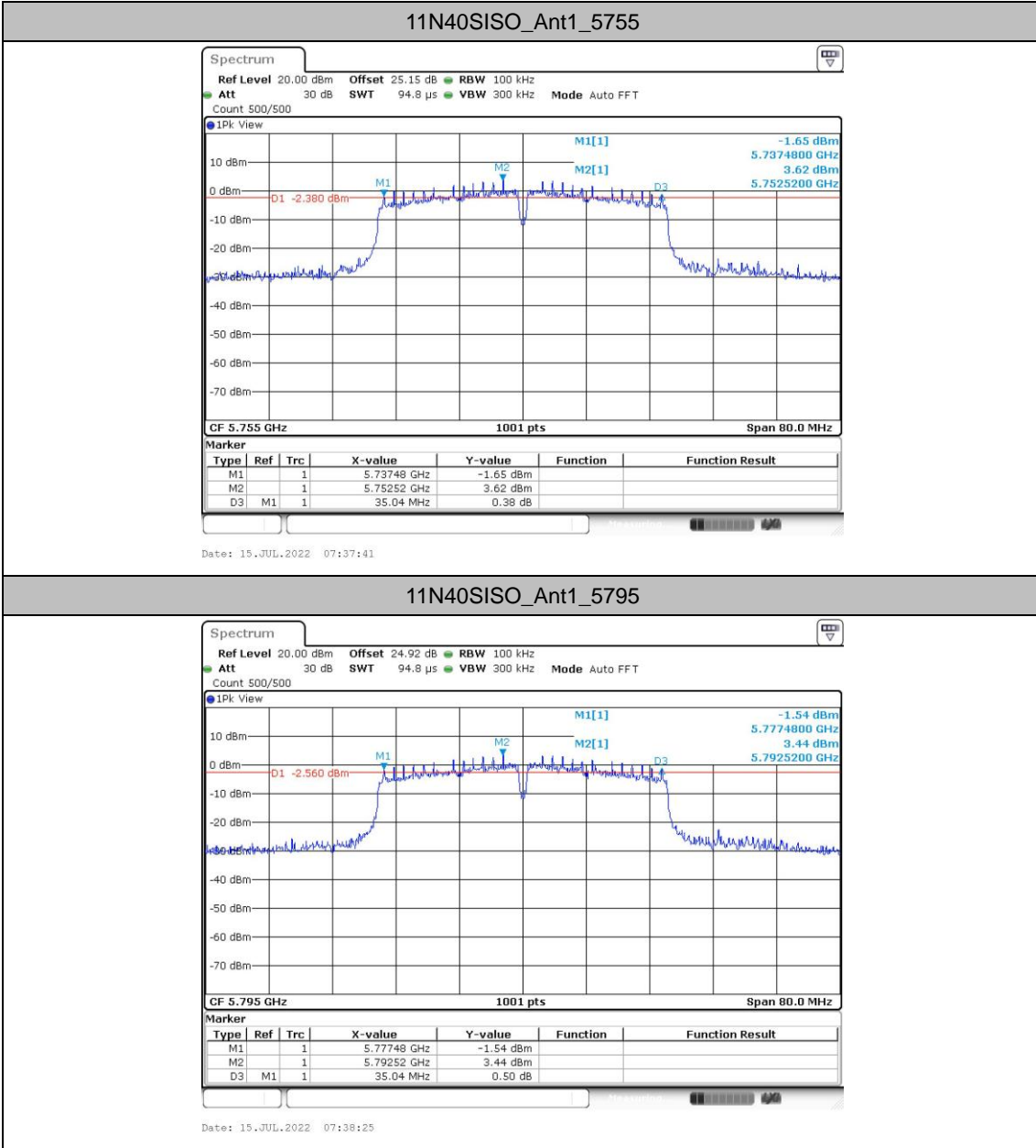


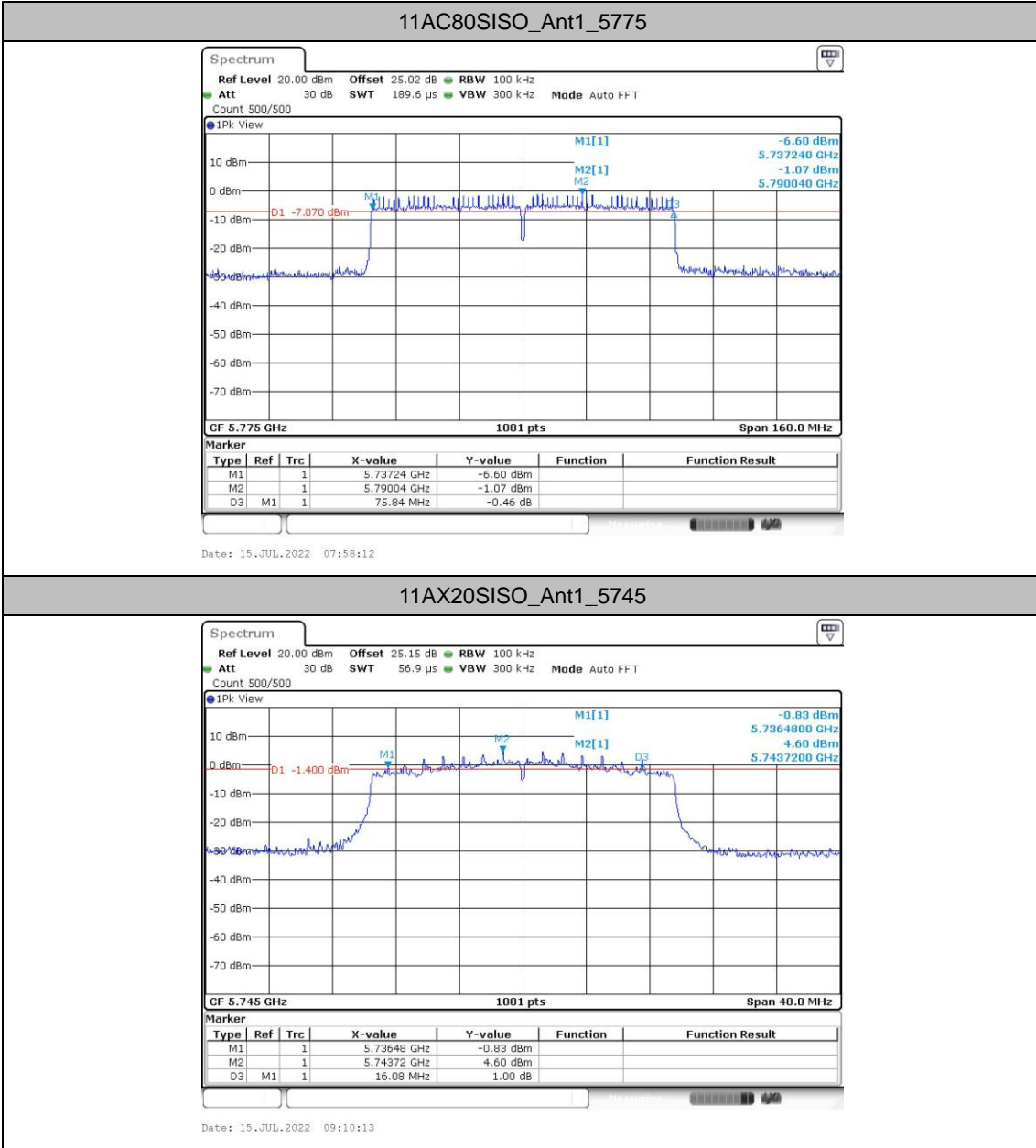
11N20SISO_Ant1_5785

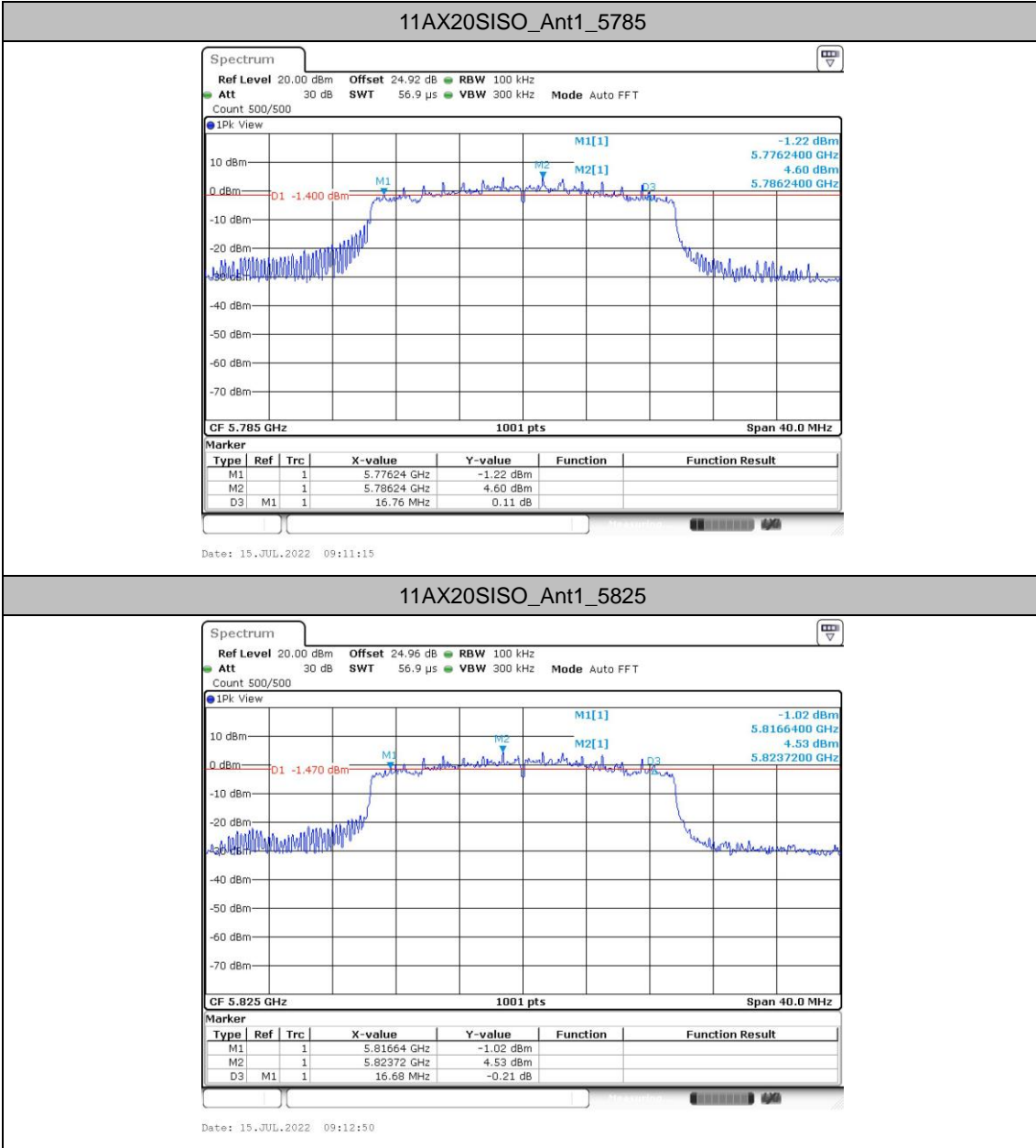


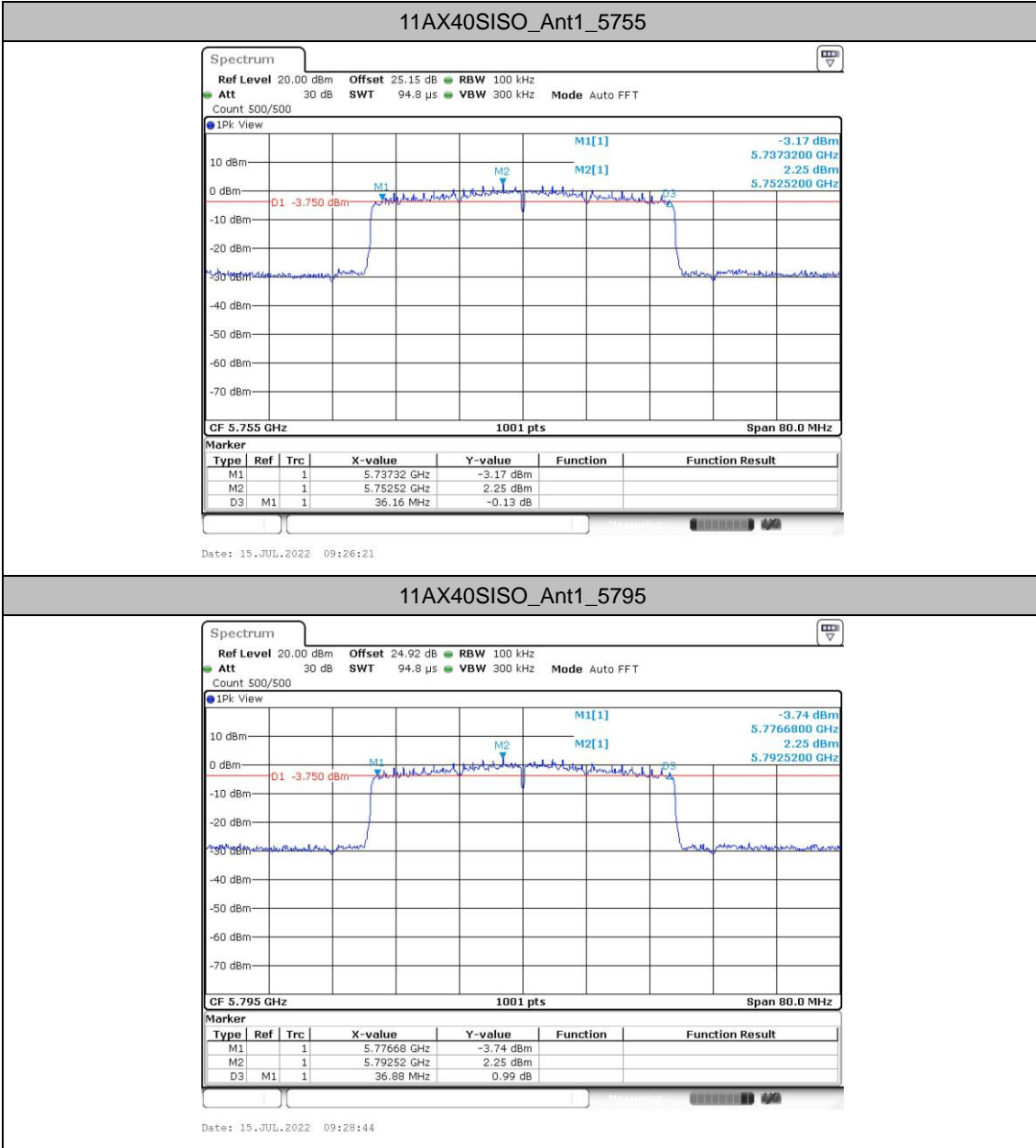
11N20SISO_Ant1_5825

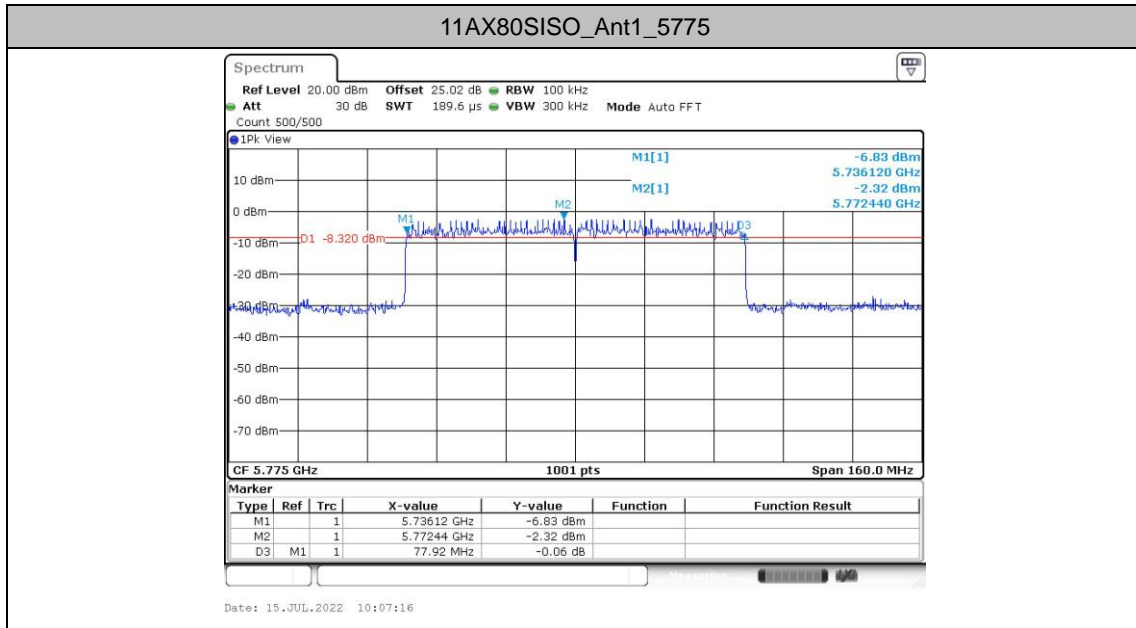














Maximum conducted output power

Test Result Channel Power

| Test Mode | Antenna | Freq (MHz) | Set Power | Channel Power [dBm] | Duty Cycle [%] | DC Factor [dBm] | Result [dBm] | Limit [dBm] | Gain [dBi] | EIRP [dBm] | EIRP Limit [dBm] | Verdict |
|-------------|---------|------------|-----------|---------------------|----------------|-----------------|--------------|-------------|------------|-------------|------------------|---------|
| 11A | Ant1 | 5745 | 17 | 17.61 | 97.20 | 0.12 | 17.73 | ≤30.00 | -3.00 | 14.73 | --- | PASS |
| | | 5785 | 17 | 17.71 | 97.20 | 0.12 | 17.83 | ≤30.00 | -3.00 | 14.83 | --- | PASS |
| | | 5825 | 17 | 17.67 | 97.20 | 0.12 | 17.79 | ≤30.00 | -3.00 | 14.79 | --- | PASS |
| 11N20 SISO | Ant1 | 5745 | 17 | 17.10 | 96.30 | 0.16 | 17.26 | ≤30.00 | -3.00 | 14.26 | --- | PASS |
| | | 5785 | 17 | 17.10 | 96.30 | 0.16 | 17.26 | ≤30.00 | -3.00 | 14.26 | --- | PASS |
| | | 5825 | 17 | 17.07 | 96.30 | 0.16 | 17.23 | ≤30.00 | -3.00 | 14.23 | --- | PASS |
| 11N40 SISO | Ant1 | 5755 | 16 | 16.35 | 92.75 | 0.33 | 16.68 | ≤30.00 | -3.00 | 13.68 | --- | PASS |
| | | 5795 | 16 | 16.41 | 92.75 | 0.33 | 16.74 | ≤30.00 | -3.00 | 13.74 | --- | PASS |
| 11AC20 SISO | Ant1 | 5745 | 15.5 | 15.67 | 97.04 | 0.13 | 15.80 | ≤30.00 | -3.00 | 12.80 | --- | PASS |
| | | 5785 | 15.5 | 15.69 | 97.04 | 0.13 | 15.82 | ≤30.00 | -3.00 | 12.82 | --- | PASS |
| | | 5825 | 15.5 | 15.68 | 97.04 | 0.13 | 15.81 | ≤30.00 | -3.00 | 12.81 | --- | PASS |
| 11AC40 SISO | Ant1 | 5755 | 15.5 | 15.92 | 92.86 | 0.32 | 16.24 | ≤30.00 | -3.00 | 13.24 | --- | PASS |
| | | 5795 | 15.5 | 15.90 | 92.86 | 0.32 | 16.22 | ≤30.00 | -3.00 | 13.22 | --- | PASS |
| 11AC80 SISO | Ant1 | 5775 | 15.5 | 15.37 | 86.49 | 0.63 | 16.00 | ≤30.00 | -3.00 | 13.00 | --- | PASS |
| 11AX20 SISO | Ant1 | 5745 | 14.5 | 14.87 | 95.28 | 0.21 | 15.08 | ≤30.00 | -3.00 | 12.08 | --- | PASS |
| | | 5785 | 14.5 | 14.95 | 95.28 | 0.21 | 15.16 | ≤30.00 | -3.00 | 12.16 | --- | PASS |
| | | 5825 | 14.5 | 15.00 | 95.28 | 0.21 | 15.21 | ≤30.00 | -3.00 | 12.21 | --- | PASS |
| 11AX40 SISO | Ant1 | 5755 | 14.5 | 15.05 | 91.38 | 0.39 | 15.44 | ≤30.00 | -3.00 | 12.44 | --- | PASS |
| | | 5795 | 14.5 | 15.08 | 91.38 | 0.39 | 15.47 | ≤30.00 | -3.00 | 12.47 | --- | PASS |
| 11AX80 SISO | Ant1 | 5775 | 14.5 | 14.74 | 87.88 | 0.56 | 15.30 | ≤30.00 | -3.00 | 12.30 | --- | PASS |



Maximum power spectral density

Test Result

| TestMode | Antenna | Freq(MHz) | Result [dBm/MHz] | Limit[dBm/MHz] | Verdict |
|------------|---------|-----------|------------------|----------------|---------|
| 11A | Ant1 | 5745 | 4.59 | ≤30.00 | PASS |
| | | 5785 | 4.28 | ≤30.00 | PASS |
| | | 5825 | 4.19 | ≤30.00 | PASS |
| 11N20SISO | Ant1 | 5745 | 3.97 | ≤30.00 | PASS |
| | | 5785 | 4.36 | ≤30.00 | PASS |
| | | 5825 | 4.22 | ≤30.00 | PASS |
| 11N40SISO | Ant1 | 5755 | 0.46 | ≤30.00 | PASS |
| | | 5795 | 0.32 | ≤30.00 | PASS |
| 11AC80SISO | Ant1 | 5775 | -4.85 | ≤30.00 | PASS |
| 11AX20SISO | Ant1 | 5745 | 2 | ≤30.00 | PASS |
| | | 5785 | 2.36 | ≤30.00 | PASS |
| | | 5825 | 1.79 | ≤30.00 | PASS |
| 11AX40SISO | Ant1 | 5755 | -0.54 | ≤30.00 | PASS |
| | | 5795 | -1.08 | ≤30.00 | PASS |
| 11AX80SISO | Ant1 | 5775 | -5.09 | ≤30.00 | PASS |

Note: 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.
2.The Duty Cycle Factor and RBW Factor is compensated in the graph.



Test Graphs

