

# TEST REPORT

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Report Number : SZ1230414-19311E-RF-22G

## Test Standard (s)

ETSI EN 300 440 V2.2.1 (2018-07)

## Sample Description

Product Type: Smartphone  
Model No.: KINGKONG STAR  
Multiple Model(s) No.: N/A  
Trade Mark: CUBOT  
Date Received: 2023/04/14  
Report Date: 2023/05/24

Test Result:	Pass*
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\* In the configuration tested, the EUT complied with the standards above.

## Prepared and Checked By:

## Approved By:

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RF Engineer

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

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**DOCUMENT REVISION HISTORY**

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ1230414-19311E-RF-22G	Original Report	2023-05-24

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Frequency Range	5725-5850 MHz
Mode	802.11a/n20/n40/ac20/ac40
Maximum EIRP	13.98dBm
Modulation Technique	OFDM
Antenna Specification*	1.04dBi (It is provided by the manufacturer)
Voltage Range	DC3.87V from rechargeable Li-ion battery or DC 5/9/12V from adapter
Sample serial number	24O8-1 (RF Conducted Test) 24O8-2 (RF Radiated Test) (Assigned by BAACL, Shenzhen)
Sample/EUT Status	Good condition
Normal/Extreme Condition	L.V.: Low Voltage 3.6V <sub>DC</sub> ; L.T.: Low Temperature -10°C N.V.: Normal Voltage 3.87V <sub>DC</sub> ; N.T.: Normal Temperature +25°C H.V.: High Voltage 4.45V <sub>DC</sub> ; H.T.: High Temperature +55°C Note: the extreme test condition was declared by manufacturer.
Adapter Information	Model:HJ-PD33W-EU Input: AC100-240V~50/60Hz 0.8A Output: DC 5.0V/3.0A 15.0W OR DC9.0V. 3.0A 27.0W OR DC 12.0V/2.75A 33.0W MAX

### Objective

This report is in accordance with ETSI EN 300 440 V2.2.1 (2018-07), Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard for access to radio spectrum

The object is to determine compliance with ETSI EN 300 440 V2.2.1 (2018-07).

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

Each test item follows test standards and with no deviation.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system support 802.11a/n-ht20/n-ht40/ac vht20/ac vht40, the n-ht20/n-ht40 were reduced since the identical parameters with ac vht20/ac vht40.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	159	5795
151	5755	161	5805
153	5765	165	5825
157	5785	/	/

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PSD across all data rates bandwidths, and modulations.

For 802.11a/ac20 mode: channel 149, 157, 165 were tested;

For 802.11ac40 mode: channel 151, 159 were tested;

### EUT Exercise Software

Test in the engineering mode. The power level was provided by the manufacturer.

The worst case as below:

Mode	Data rate	Power Level		
		Low Channel	Middle Channel	High Channel
802.11a	6Mbps	Default	Default	Default
802.11ac-VHT20	MCS0	Default	Default	Default
802.11ac-VHT40	MCS0	Default	/	Default

### Special Accessories

No special accessory.

### Equipment Modifications

No modifications were made to the unit tested.

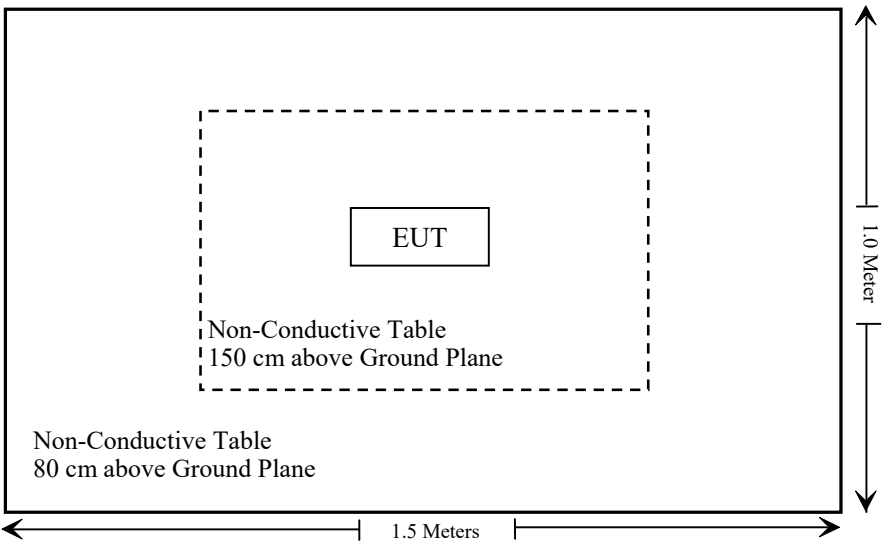
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>ETSI EN 300 440 V2.2.1 (2018-07)</b>	<b>Description of test</b>	<b>Result</b>
§ 4.2.2	Equivalent isotropically radiated power	Compliant
§ 4.2.3	Permitted range of operating frequencies	Compliant
§ 4.2.4	Unwanted emissions in the spurious domain	Compliant
§ 4.2.5.4	Duty Cycle	Compliant*
§ 4.2.6	Additional requirements for FHSS equipment	Not Applicable
§ 4.3.3	Adjacent channel selectivity	Not Applicable*
§ 4.3.4	Blocking or desensitization	Compliant
§ 4.3.5	Spurious radiation	Compliant
§ 4.4	Spectrum access techniques	Not Applicable**
§ 4.6.4	GBSAR antenna pattern	Not Applicable***
Annex F	Limits for GBSAR	Not Applicable***

Not Applicable: The EUT is not a FHSS equipment.

Not Applicable\*: The receiver category is 3.

Compliant \*: There is no restriction.

Not Applicable\*\*: The EUT is not used for media access.

Not Applicable\*\*\*: The EUT is not used in the GBSAR system.



**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test</b>					
R&S	EMI Test Receiver	ESR3	102455	2022/07/28	2023/07/27
Sonoma instrument	Pre-amplifier	310 N	186238	2022/11/11	2023/11/10
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
Unknown	Cable	Chamber Cable 1	F-03-EM236	2022/11/11	2023/11/10
Unknown	Cable	Chamber Cable 4	EC-007	2022/11/11	2023/11/10
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2022/07/04	2023/07/03
COM-POWER	Pre-amplifier	PA-122	181919	2022/11/25	2023/11/24
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/01/15	2024/01/14
A.H.System	Horn Antenna	SAS-200/571	135	2021/07/14	2024/07/13
Insulated Wire Inc.	RF Cable	SPS-2503-3150	02222010	2022/11/25	2023/11/24
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2022/11/25	2023/11/24
Agilent	Signal Generator	N5183A	MY51040755	2023/02/08	2024/02/07
SNSD	5G Band Reject filter	BSF5150- 5850MN-0899- 004	5G filter	2023/04/18	2024/04/17
A.H.System	Pre-amplifier	PAM-1840VH	190	2022/08/03	2023/08/02
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2021/10/21	2024/10/20
Electro-Mechanics Co	Horn Antenna	3116	2026	2021/10/21	2024/10/20
<b>RF Conducted Test</b>					
BACL	Temperature & Humidity Chamber	BTH-150-40	30145	2023/02/08	2024/02/07
Tonscend	RF control Unit	JS0806-2	19D8060154	2022/09/15	2023/09/14
Rohde & Schwarz	Signal and Spectrum Analyzer	FSV40	101473	2023/02/08	2024/02/07
Agilent	MXG Vector Signal Generator	N5182B	MY53051503	2022/07/04	2023/07/03
Agilent	Signal Generator	N5183A	MY51040755	2023/02/08	2024/02/07
R&S	Wideband Radio Communication Tester	CMW500	141718	2022/10/12	2023/10/11
Weinschel	Power divider	1515	MY628	2022/11/25	2023/11/24
instek	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2023/2/10	2024/2/9

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

## ETSI EN 300 440 V2.2.1 (2018-07) §4.2.2 –EQUIVALENT ISOTROPICALLY RADIATED POWER (e.i.r.p.)

### Standard Applicable

According to ETSI EN 300 440 section 5, the effective radiated power applies to equipment with an integral antenna and to equipment supplied with a dedicated antenna.

If the equipment is designed to operate with different carrier powers, the rated power for each level of range of levels shall be declared by the manufacturer.

The transmitter maximum e.i.r.p. under normal and extreme test conditions shall not exceed the values given in table 2.

**Table 2: Maximum radiated peak power (e.i.r.p.)**

Frequency Bands	Power	Application	Notes
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Non-specific short range devices	
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Radio determination devices	
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices	See also table 4 and annex D
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Non-specific short range devices	
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radio determination devices	
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radio determination devices	
10,5 GHz to 10,6 GHz	500 mW e.i.r.p.	Radio determination devices	
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radio determination devices	
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radio determination devices	See annex F
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Non-specific short range devices and Radio determination devices	

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Lee on 2023-04-27.*

*Test Mode: Transmitting*

**Test Result: Pass**

*Please refer to the Appendix.*

## ETSI EN 300 440 V2.2.1 (2018-07) §4.2.3 – PERMITTED RANGE OF OPERATING FREQUENCIES

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### Applicable Standard

The width of the power spectrum envelope is  $f_H - f_L$  for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by the lowest value of  $f_L$  and the highest value of  $f_H$  resulting from the adjustment of the equipment to the lowest and highest operating frequencies.

The occupied bandwidth (i.e. the bandwidth in which 99 % of the wanted emission is contained) and the necessary bandwidth of the transmitter shall fall within the assigned frequency band.

For all equipment the frequency range shall lie within the frequency band given by clause 4.2.2.4, table 2. For non-harmonized frequency bands the available frequency range may differ between national administrations.

$F_H$  is the highest frequency of the power envelope, it is the frequency furthest above the frequency of maximum power where the output power envelope drops below the level of -75 dBm/Hz spectral power density (e.g. -30 dBm if measured in a 30 kHz reference bandwidth) e.i.r.p.

$F_L$  is the lowest frequency of the power envelope; it is the frequency furthest below the frequency of maximum power where the output power drops below the level of -75 dBm/Hz spectral power density (e.g. -30 dBm if measured in a 30 kHz reference bandwidth) e.i.r.p.

The power envelope shall contain the occupied bandwidth representing 99 % of the emissions.

The occupied and necessary bandwidths of the transmitter shall be declared. Where differing modes of emission are available, all modes and their associated bandwidths shall be stated.

### Test Procedure

- a) put the spectrum analyser in video averaging mode with a minimum of H.T. sweeps selected;
- b) select the lowest operating frequency of the equipment under test and activate the transmitter with modulation applied. The RF emission of the equipment shall be displayed on the spectrum analyser;
- c) using the marker of the spectrum analyser, find the lowest frequency below the operating frequency at which the spectral power density drops below the level given in clause 7.2. This frequency shall be recorded in the test report;
- d) select the highest operating frequency of the equipment under test and find the highest frequency at which the spectral power density drops below the value given in clause 7.2. This frequency shall be recorded in the test report;
- e) the difference between the frequencies measured in steps c) and d) is the operating frequency range. It shall be recorded in the test report.

This measurement shall be repeated for each frequency range declared by the manufacturer.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Lee on 2023-04-27.*

*Test Mode: Transmitting*

**Test Result:** Compliant.

Please refer to following tables and plots.

Operating frequency range:

**802.11 a mode:**

Test Condition		Frequency (MHz)			
Temperature	Voltage	f <sub>L</sub> at Low Channel	f <sub>H</sub> at High Channel	f <sub>L</sub> Limit	f <sub>H</sub> Limit
L.T.	L.V.	5735.6086	5834.4316	5725	5875
	H.V.	5735.6069	5834.4320	5725	5875
N.T.	N.V.	5735.6094	5834.4316	5725	5875
H.T.	L.V.	5735.6082	5834.4320	5725	5875
	H.V.	5735.6076	5834.4320	5725	5875

**802.11 ac 20 mode:**

Test Condition		Frequency (MHz)			
Temperature	Voltage	f <sub>L</sub> at Low Channel	f <sub>H</sub> at High Channel	f <sub>L</sub> Limit	f <sub>H</sub> Limit
L.T.	L.V.	5735.2554	5834.7144	5725	5875
	H.V.	5735.2545	5834.7147	5725	5875
N.T.	N.V.	5735.2565	5834.7145	5725	5875
H.T.	L.V.	5735.2551	5834.7148	5725	5875
	H.V.	5735.2545	5834.7148	5725	5875

**802.11 ac 40 mode:**

Test Condition		Frequency (MHz)			
Temperature	Voltage	f <sub>L</sub> at Low Channel	f <sub>H</sub> at High Channel	f <sub>L</sub> Limit	f <sub>H</sub> Limit
L.T.	L.V.	5736.2186	5813.7815	5725	5875
	H.V.	5736.2174	5813.7813	5725	5875
N.T.	N.V.	5736.2195	5813.7813	5725	5875
H.T.	L.V.	5736.2187	5813.7810	5725	5875
	H.V.	5736.2178	5813.7809	5725	5875

**Occupied bandwidth Please refer to the Appendix.**

## ETSI EN 300 440 V2.2.1 (2018-07) §4.2.4 – UNWANTED EMISSION IN THE SPURIOUS EMISSIONS DOMAIN

### Applicable Standard

The level of spurious emissions shall be measured as either:

- a)
  - i) their power level in a specified load (conducted emission); and
  - ii) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or
- b) their effective radiated power when radiated by the cabinet and the integral or dedicated antenna, in the case of equipment fitted with such an antenna and no permanent RF connector.

For measurements above 1 000 MHz the peak value shall be measured using a spectrum analyser. The "max hold" function of a spectrum analyser shall be used. For measurements up to 1 000 MHz the quasi-peak detector set in accordance with the specification of CISPR 16 [1], [2] and [3] shall be used.

The correction for RBW described in clause 5.8.5 is to be applied to the measured results as applicable.

### Limits

The maximum power limits of any unwanted emissions in the spurious domain are given in table 3.

**Table 3: Spurious emissions**

Frequency ranges	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1 000 MHz	Frequencies > 1 000 MHz
State			
Operating	4 nW	250 nW	1 μW
Standby	2 nW	2 nW	20 nW

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

## EUT Setup

The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with ETSI EN 300 440. The specifications used were the ETSI EN 300 440 limits.

## Spectrum Analyzer Setup

According to ETSI EN 300 440, the EUT was tested from 25MHz to 40 GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
Below 30 MHz	10 kHz	30 kHz	Peak
30 MHz – 1000 MHz	100 kHz	300 kHz	Peak
Above 1 GHz	1 MHz	3 MHz	Peak

## Test Procedure

### 1) Method of measurement cabinet spurious radiation

This method of measurement applies to transmitters having a permanent antenna connector. For equipment without a permanent antenna connector see clause 4.2.4.3.3.

Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4.

a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver, after allowing for the coupling loss, is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.

The transmitter under test shall be placed on the support in its standard position, connected to an artificial antenna (see clause 5.8.2) and switched on without modulation. If modulation cannot be inhibited then the test shall be carried out with modulation, (see clause 5.8.1), and this fact shall be recorded in the test report.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25MHz up to twice the carrier frequency, not exceeding 66 GHz, except for the channel on which the transmitter is intended to operate and for channelized systems, its adjacent channels. The frequency of each spurious emission detected shall be noted. If the test site is disturbed by interference coming from outside the site, this qualitative search may be performed in a screened room, with a reduced distance between the transmitter and the test antenna.

c) At each frequency at which an emission has been detected, the measuring receiver shall be tuned and the test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver.

- d) The transmitter shall be rotated through  $360^{\circ}$  about a vertical axis, to maximize the received signal.
- e) The test antenna shall be raised or lowered again through the specified height range until a maximum is obtained. This level shall be noted.
- f) The substitution antenna (see clause B.2.3) shall replace the transmitter antenna in the same position and in vertical polarization. It shall be connected to the signal generator.
- g) At each frequency at which an emission has been detected, the signal generator, substitution antenna, and measuring receiver shall be tuned. The test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver. The level of the signal generator giving the same signal level on the measuring receiver as in item e) shall be noted. After corrections due to the gain of the substitution antenna and the cable loss between the signal generator and the substitution antenna, is the radiated spurious emission at this frequency.
- h) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.
- i) Steps c) to h) shall be repeated with the test antenna oriented in horizontal polarization.
- j) If a user accessible power adjustment is provided then the tests in steps c) to h) shall be repeated at the lowest power setting available.
- k) Steps c) to i) shall be repeated with the transmitter in the standby condition if this option is available.

## 2) Method of measurement radiated spurious emission

This method of measurement applies to transmitters having an integral antenna.

Additional requirements for equipment employing FHSS modulation are given in clause 4.2.4.3.4.

- a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver, through a suitable filter to avoid overloading of the measuring receiver if required.

The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver, after allowing for the coupling loss, is at least 6 dB below the spurious emission limit given in table 3, see clause 4.2.4.4. This bandwidth shall be recorded in the test report.

For the measurement of spurious emissions below the second harmonic of the carrier frequency the optional filter used shall be a high "Q" (notch) filter centred on the transmitter carrier frequency and attenuating this signal by at least 30 dB.

For the measurement of spurious emissions at and above the second harmonic of the carrier frequency the optional filter used shall be a high pass filter with a stop band rejection exceeding 40 dB. The cut-off frequency of the high pass filter shall be approximately 1.5 times the transmitter carrier frequency. The transmitter under test shall be placed on the support in its standard position and shall be switched on without modulation. If modulation cannot be inhibited then the test shall be carried out with modulation (see clause 6.1) and this fact shall be recorded in the test report.

- b) The same method of measurement as steps b) and k) of clause 4.2.4.3.2 shall be used.



**Test Data****Environmental Conditions**

<b>Temperature:</b>	24.5~25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by York Yang on 2023-04-26 for below 1GHz and Zenos Qiao on 2023-04-28 for above 1GHz.

Test Mode: Transmitting (Worst case)

**25 MHz - 40GHz**

Frequency (MHz)	Receiver Reading (dBμV)	TurnTable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	EN 300 440	
			Height (m)	Polar (H/V)	Substituted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
802.11 a mode – Low channel										
954.2	32.52	279	2.5	H	-64.0	1.36	0.0	-65.36	-36	29.36
954.2	32.07	11	1.6	V	-62.0	1.36	0.0	-63.36	-36	27.36
11490.00	44.04	144	2.1	H	-53.0	2.50	10.60	-44.90	-30	14.90
11490.00	44.35	146	2.0	V	-52.9	2.50	10.60	-44.80	-30	14.80
802.11 a mode – High channel										
953.9	32.83	231	1.9	H	-63.7	1.36	0.0	-65.06	-36	29.06
953.9	32.29	15	1.8	V	-61.8	1.36	0.0	-63.16	-36	27.16
11650.00	44.16	316	2.2	H	-53.3	2.50	11.10	-44.70	-30	14.70
11650.00	44.21	93	2.0	V	-53.7	2.50	11.10	-45.10	-30	15.10
Standby										
956.2	32.76	262	1.8	H	-63.7	1.36	0.0	-65.06	-57	8.06
956.2	31.81	252	1.5	V	-62.2	1.36	0.0	-63.56	-57	6.56
1481.55	41.73	13	2.4	H	-66.9	1.60	8.50	-60.00	-47	13.00
1481.55	41.34	141	2.1	V	-67.6	1.60	8.50	-60.70	-47	13.70

**Note:**

- 1) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level
- 3) Below 1G antenna gain unit is dBd, above 1G antenna gain unit is dBi

## ETSI EN 300 440 V2.2.1 (2018-07) §4.3.4–BLOCKING OR DESENSITIZATION

### Applicable Standard

Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the occupied bandwidth.

### Limits

The blocking level, for any frequency within the specified ranges, shall not be less than the values given in table 6, except at frequencies on which spurious responses are found.

**Table 6: Limits for blocking or desensitization**

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	-60 dBm + k

The correction factor,  $k$ , is as follows:

$$k = -20 \log f - 10 \log BW$$

Where:

- $f$  is the frequency in GHz;
- $BW$  is the occupied bandwidth in MHz.

The factor  $k$  is limited within the following:

- $-40 \text{ dB} < k < 0 \text{ dB}$ .

The measured blocking level shall be stated in the test report.

### Test Procedure

This measurement shall be conducted under normal conditions.

Two signal generators A and B shall be connected to the receiver via a combining network to the receiver, either:

- a) via a test fixture or a test antenna to the receiver integrated, dedicated or test antenna; or
- b) directly to the receiver permanent or temporary antenna connector.

The method of coupling to the receiver shall be stated in the test report.

Signal generator A shall be at the nominal frequency of the receiver, with normal modulation of the wanted signal. Signal generator B shall be unmodulated and shall be adjusted to a test frequency at approximately 10 times, 20 times and 50 times of the occupied bandwidth above upper band edge of occupied bandwidth. Initially signal generator B shall be switched off and using signal generator A the level which still gives sufficient response shall be established. The output level of generator A shall then be increased by 3 dB. Signal generator B is then switched on and adjusted until the wanted criteria are met.

This level shall be recorded. The measurement shall be repeated with the test frequency for signal generator B at 10 times, 20 times and 50 times of the occupied bandwidth below the lower band edge of the occupied bandwidth. The blocking or desensitization shall be recorded as the level in dBm of lowest level of the unwanted signal (generator B). For tagging systems (e.g. RF identification, anti-theft, access control, location and similar systems) signal generator A may be replaced by a physical tag positioned at 70 % of the measured system range in metres. In this case, the blocking or desensitization shall be recorded as the ratio in dB of lowest level of the unwanted signal (generator B) resulting in a non-read of the tag, to the declared sensitivity of the receiver +3 dB.

## Test Data

### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Lee on 2023-04-27.

Test mode: Receive (Worst case is 802.11a mode)

Frequency (MHz)	Frequency offset (MHz)	Test Result (dBm)	Limit (dBm)	Result
5745	10*OBWbelow OBW low edge	-80.65	-87.32	PASS
	10*OBWabove OBW high edge	-77.78	-87.32	PASS
	20*OBWbelow OBW low edge	-77.05	-87.32	PASS
	20*OBWabove OBW high edge	-75.88	-87.32	PASS
	50*OBWbelow OBW low edge	-74.78	-87.32	PASS
	50*OBWabove OBW high edge	-74.01	-87.32	PASS

Frequency (MHz)	Frequency offset (MHz)	Test Result (dBm)	Limit (dBm)	Result
5825	10*OBWbelow OBW low edge	-82.75	-87.44	PASS
	10*OBWabove OBW high edge	-81.93	-87.44	PASS
	20*OBWbelow OBW low edge	-76.34	-87.44	PASS
	20*OBWabove OBW high edge	-75.87	-87.44	PASS
	50*OBWbelow OBW low edge	-73.53	-87.44	PASS
	50*OBWabove OBW high edge	-69.99	-87.44	PASS

Note: the receiver category is 3.

## ETSI EN 300 440 V2.2.1 (2018-07) §4.3.5– RECEIVER SPURIOUS RADIATIONS

### Applicable Standard

For measurements above 1 000 MHz the peak value shall be measured using a spectrum analyser. The "max hold" function of a spectrum analyser shall be used. For measurements up to 1 000 MHz the quasi-peak detector set in accordance with the specification of CISPR 16 [1], [2] and [3] shall be used.

### EUT Setup

The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with ETSI EN 300 440. The specifications used were the ETSI EN 300 440 limits.

### Spectrum Analyzer Setup

According to ETSI EN 300 440, the EUT was tested from 25MHz to 40 GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
Below 30 MHz	10 kHz	30 kHz	Peak
30 MHz – 1000 MHz	100 kHz	300 kHz	Peak
Above 1 GHz	1 MHz	3 MHz	Peak

### Test Procedure

#### 1) Method of measurement conducted spurious components

This method of measurement applies to receivers having a permanent antenna connector.

A test load, H.T.Ω power attenuator, may be used to protect the measuring receiver (see clause 6.5) against damage when testing a receiver combined in one unit with a transmitter.

The measuring receiver used shall have sufficient dynamic range and sensitivity to achieve the required measurement accuracy at the specified limit. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report:

a) The receiver input terminals shall be connected to a measuring receiver having an input impedance of H.T. Ω and the receiver is switched on.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25MHz up to twice the carrier frequency not exceeding 66 GHz. The frequency and the absolute power level of each of the spurious components found shall be noted.

c) If the detecting device is not calibrated in terms of power input, the level of any detected components shall be determined by replacing the receiver by the signal generator and adjusting it to reproduce the

frequency and level of every spurious component noted in step b). The absolute power level of each spurious component shall be noted.

d) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

## 2) Method of measurement cabinet radiation

This method of measurement applies to receivers having a permanent antenna connector.

a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report.

The receiver under test shall be placed on the support in its standard position and connected to an artificial antenna, see clause 5.8.2.

b) For carrier frequencies in the range 1 GHz to 20 GHz the frequency of the measuring receiver shall be adjusted over the frequency range 25 MHz to 10 times the carrier frequency, not exceeding 40 GHz. For carrier frequencies above 20 GHz the measuring receiver shall be tuned over the range 25 MHz up to twice the carrier frequency not exceeding 66 GHz. The frequency of each spurious component shall be noted. If the test site is disturbed by radiation coming from outside the site, this qualitative search may be performed in a screened room with reduced distance between the transmitter and the test antenna.

c) At each frequency at which a component has been detected, the measuring receiver shall be tuned and the test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver.

d) The receiver shall be rotated up to 360° about a vertical axis, to maximize the received signal.

e) The test antenna shall be raised or lowered again through the specified height range until a maximum is obtained. This level shall be noted.

f) The substitution antenna (see clause B.3.2) shall replace the receiver antenna in the same position and in vertical polarization. It shall be connected to the signal generator.

g) At each frequency at which a component has been detected, the signal generator, substitution antenna and measuring receiver shall be tuned. The test antenna shall be raised or lowered through the specified height range until the maximum signal level is detected on the measuring receiver. The level of the signal generator giving the same signal level on the measuring receiver as in step e) shall be noted. This level, after correction due to the gain of the substitution antenna and the cable loss, is the radiated spurious component at this frequency.

h) The frequency and level of each spurious emission measured and the bandwidth of the measuring receiver shall be recorded in the test report.

i) Measurements b) to h) shall be repeated with the test antenna oriented in horizontal polarization.

### 3) Method of measurement radiated spurious components

This method of measurement applies to receivers having an integral antenna.

a) A test site selected from annex B which fulfils the requirements of the specified frequency range of this measurement shall be used. The test antenna shall be oriented initially for vertical polarization and connected to a measuring receiver. The bandwidth of the measuring receiver shall be adjusted until the sensitivity of the measuring receiver is at least 6 dB below the spurious emission limit given in clause 4.3.5.4. This bandwidth shall be recorded in the test report.

The receiver under test shall be placed on the support in its standard position.

b) The same method of measurement as items b) to i) of clause 4.3.5.3.2 shall apply.

## Test Data

### Environmental Conditions

Temperature:	24.5~25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

*The testing was performed by York Yang on 2023-04-26 for below 1GHz and Zenos Qiao on 2023-04-28 for above 1GHz.*

*Test mode: Receiving (worst case)*

Frequency (MHz)	Receiver Reading (dBμV)	TurnTable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	EN 300 440	
			Height (m)	Polar (H/V)	Substituted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
802.11 a mode – Low channel										
956.8	33.04	150	1.0	H	-63.5	1.36	0.0	-64.86	-57	7.86
956.8	32.06	202	2.1	V	-62.0	1.36	0.0	-63.36	-57	6.36
1431.59	41.86	286	1.1	H	-66.4	1.60	7.90	-60.10	-47	13.10
1431.59	41.98	147	1.1	V	-66.6	1.60	7.90	-60.30	-47	13.30
802.11 a mode – High channel										
957.1	33.19	324	1.4	H	-63.3	1.36	0.0	-64.66	-57	7.66
957.1	32.27	221	1.8	V	-61.8	1.36	0.0	-63.16	-57	6.16
1446.68	42.30	169	2.1	H	-66.0	1.60	7.90	-59.70	-47	12.70
1446.68	42.69	24	1.9	V	-65.9	1.60	7.90	-59.60	-47	12.60

#### Note:

- 1) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level
- 3) Below 1G antenna gain unit is dBd, above 1G antenna gain unit is dBi

## **EXHIBIT A - EUT PHOTOGRAPHS**

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Please refer to the report number is SZ1230414-19311E-EUT.

## **EXHIBIT B - TEST SETUP PHOTOGRAPHS**

**Radiated Spurious Emissions Test View (Below 1GHz)**



**Radiated Spurious Emissions Test View (Above 1GHz)**





## APPENDIX

### Appendix A: RF Output Power

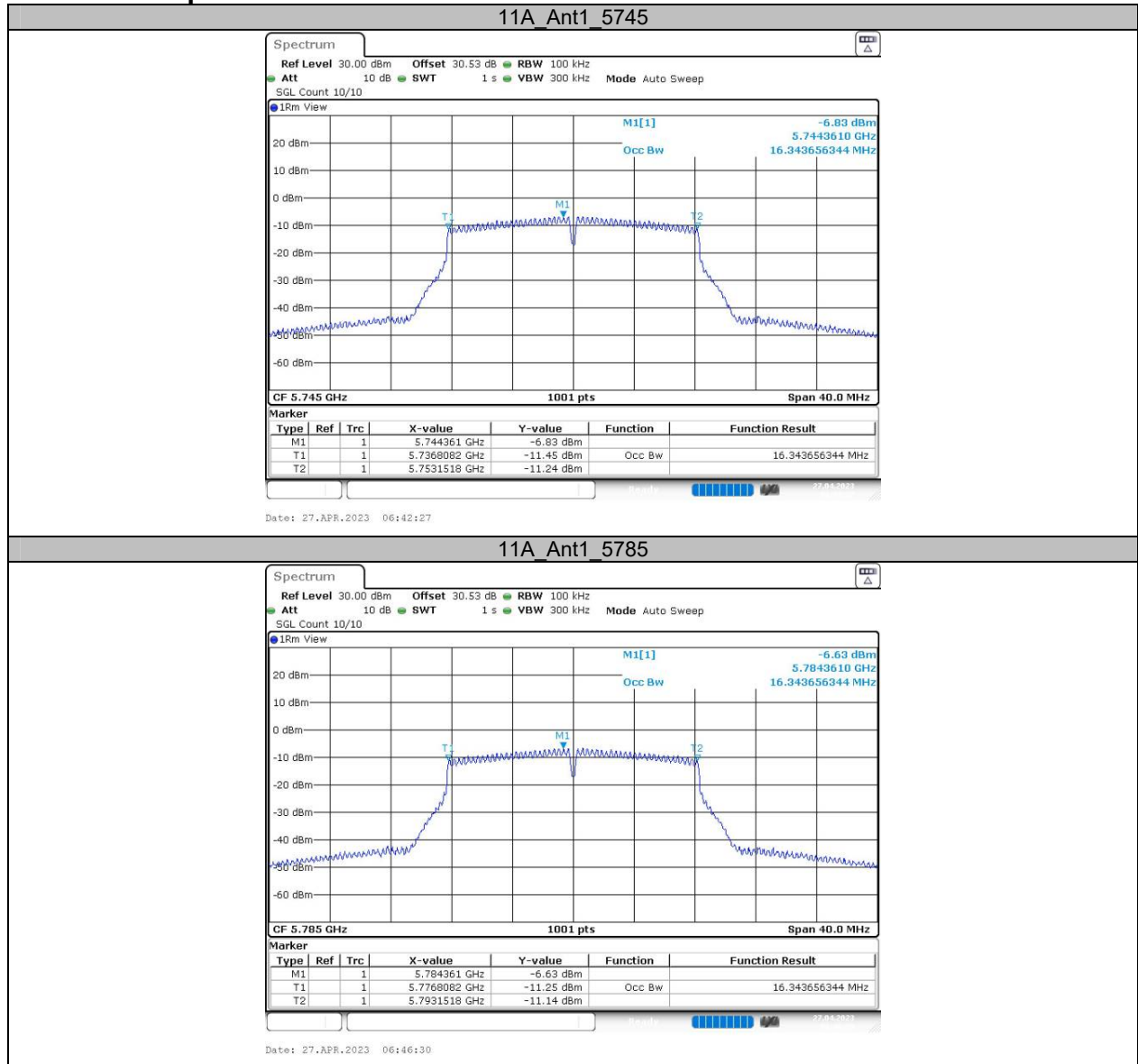
#### Test Result

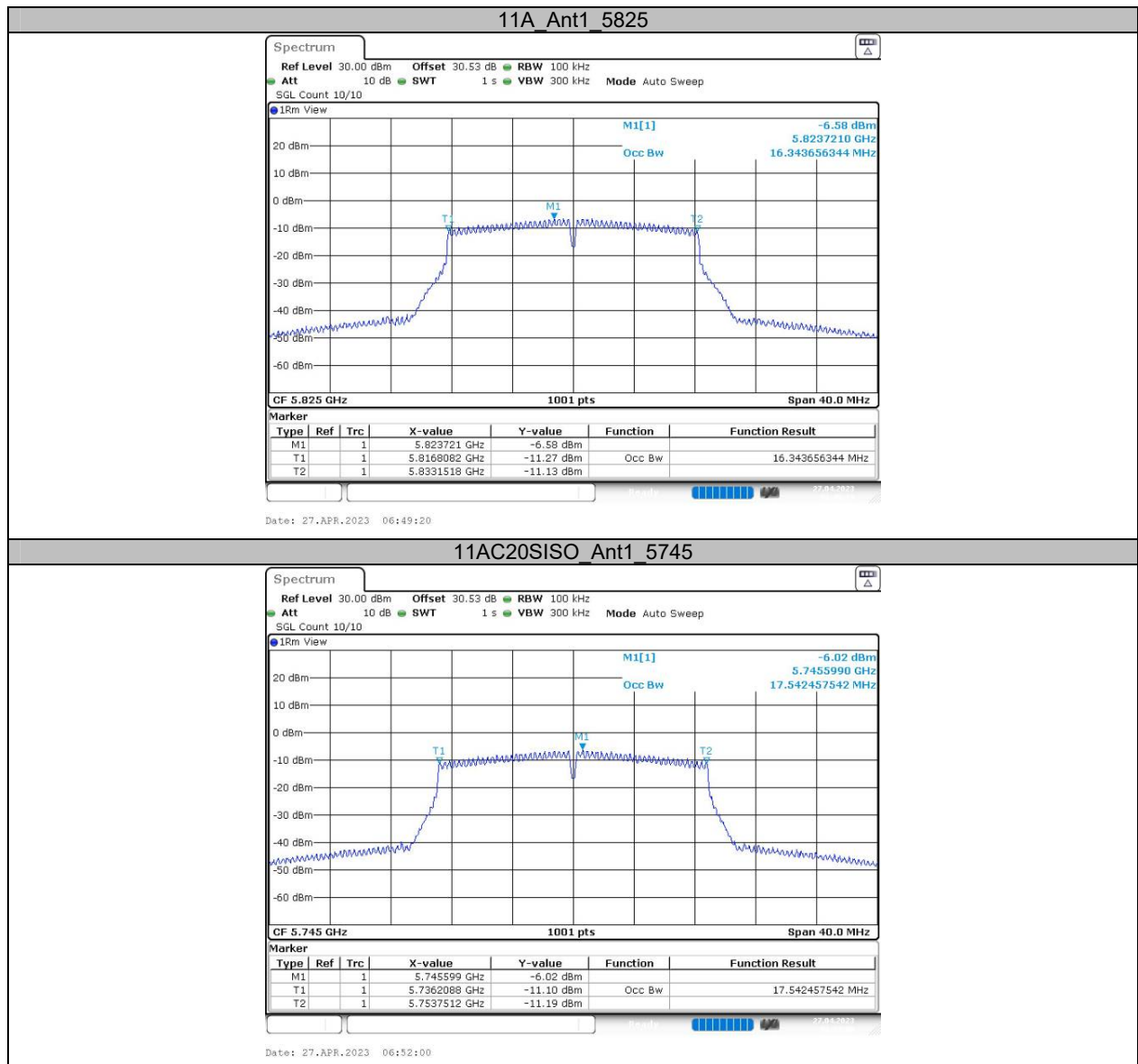
Test Condition	TestMode	Antenna	Channel	Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
NTNV	11A	Ant1	5745	12.47	13.51	14	PASS
			5785	12.49	13.53	14	PASS
			5825	12.54	13.58	14	PASS
	11AC20SISO	Ant1	5745	12.76	13.80	14	PASS
			5785	12.89	13.93	14	PASS
			5825	12.91	13.95	14	PASS
	11AC40SISO	Ant1	5755	12.53	13.57	14	PASS
			5795	12.51	13.55	14	PASS
LTHV	11A	Ant1	5745	12.49	13.53	14	PASS
			5785	12.52	13.56	14	PASS
			5825	12.55	13.59	14	PASS
	11AC20SISO	Ant1	5745	12.87	13.91	14	PASS
			5785	12.87	13.91	14	PASS
			5825	12.94	13.98	14	PASS
	11AC40SISO	Ant1	5755	12.38	13.42	14	PASS
			5795	12.46	13.50	14	PASS
LTLV	11A	Ant1	5745	12.48	13.52	14	PASS
			5785	12.49	13.53	14	PASS
			5825	12.55	13.59	14	PASS
	11AC20SISO	Ant1	5745	12.85	13.89	14	PASS
			5785	12.92	13.96	14	PASS
			5825	12.87	13.91	14	PASS
	11AC40SISO	Ant1	5755	12.46	13.50	14	PASS
			5795	12.51	13.55	14	PASS
HTHV	11A	Ant1	5745	12.50	13.54	14	PASS
			5785	12.58	13.62	14	PASS
			5825	12.50	13.54	14	PASS
	11AC20SISO	Ant1	5745	12.83	13.87	14	PASS
			5785	12.80	13.84	14	PASS
			5825	12.87	13.91	14	PASS
	11AC40SISO	Ant1	5755	12.57	13.61	14	PASS
			5795	12.54	13.58	14	PASS
HTLV	11A	Ant1	5745	12.50	13.54	14	PASS
			5785	12.52	13.56	14	PASS
			5825	12.54	13.58	14	PASS
	11AC20SISO	Ant1	5745	12.85	13.89	14	PASS
			5785	12.86	13.90	14	PASS
			5825	12.87	13.91	14	PASS
	11AC40SISO	Ant1	5755	12.59	13.63	14	PASS
			5795	12.58	13.62	14	PASS

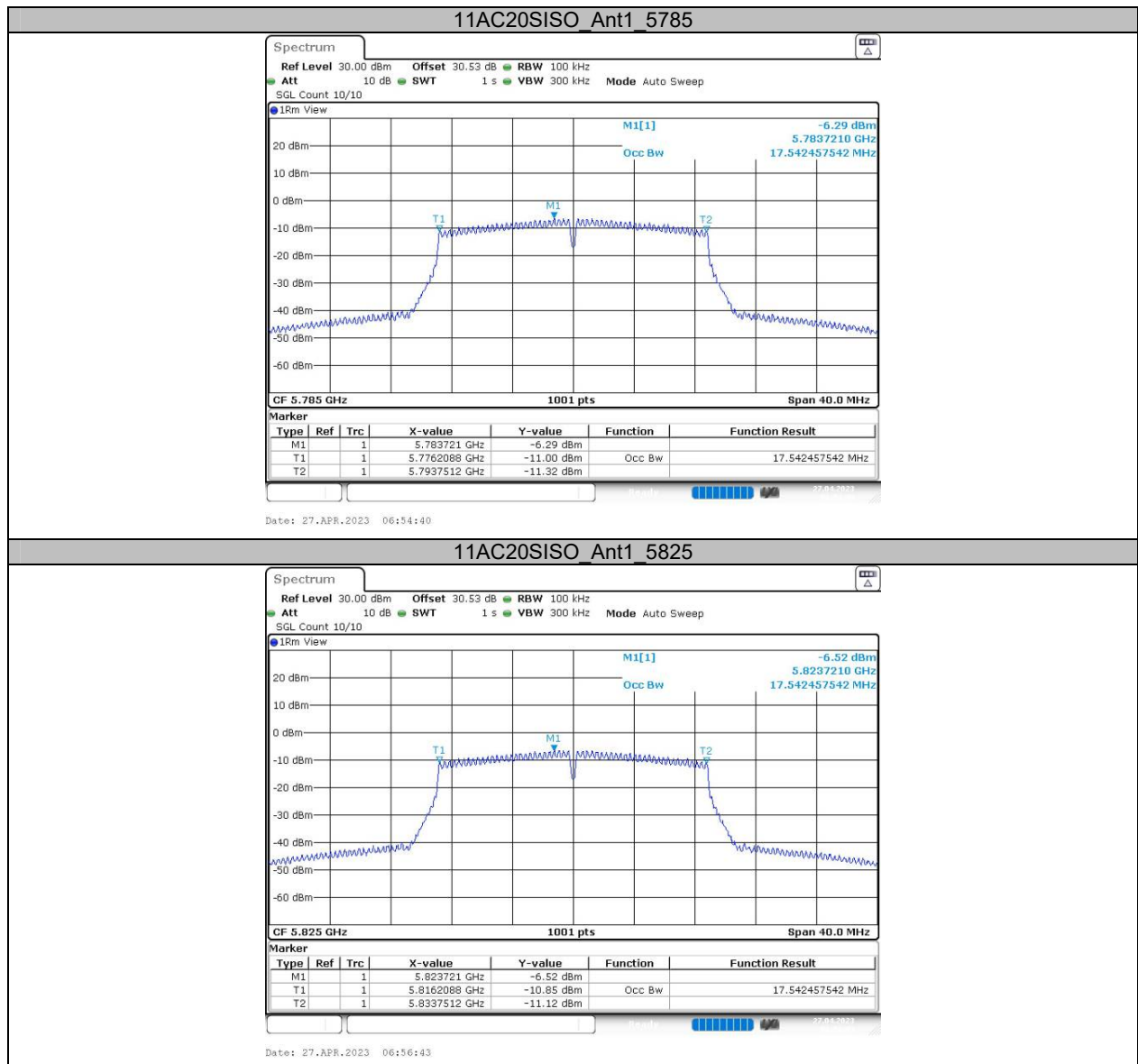
**Appendix B: Occupied Channel Bandwidth****Test Result**

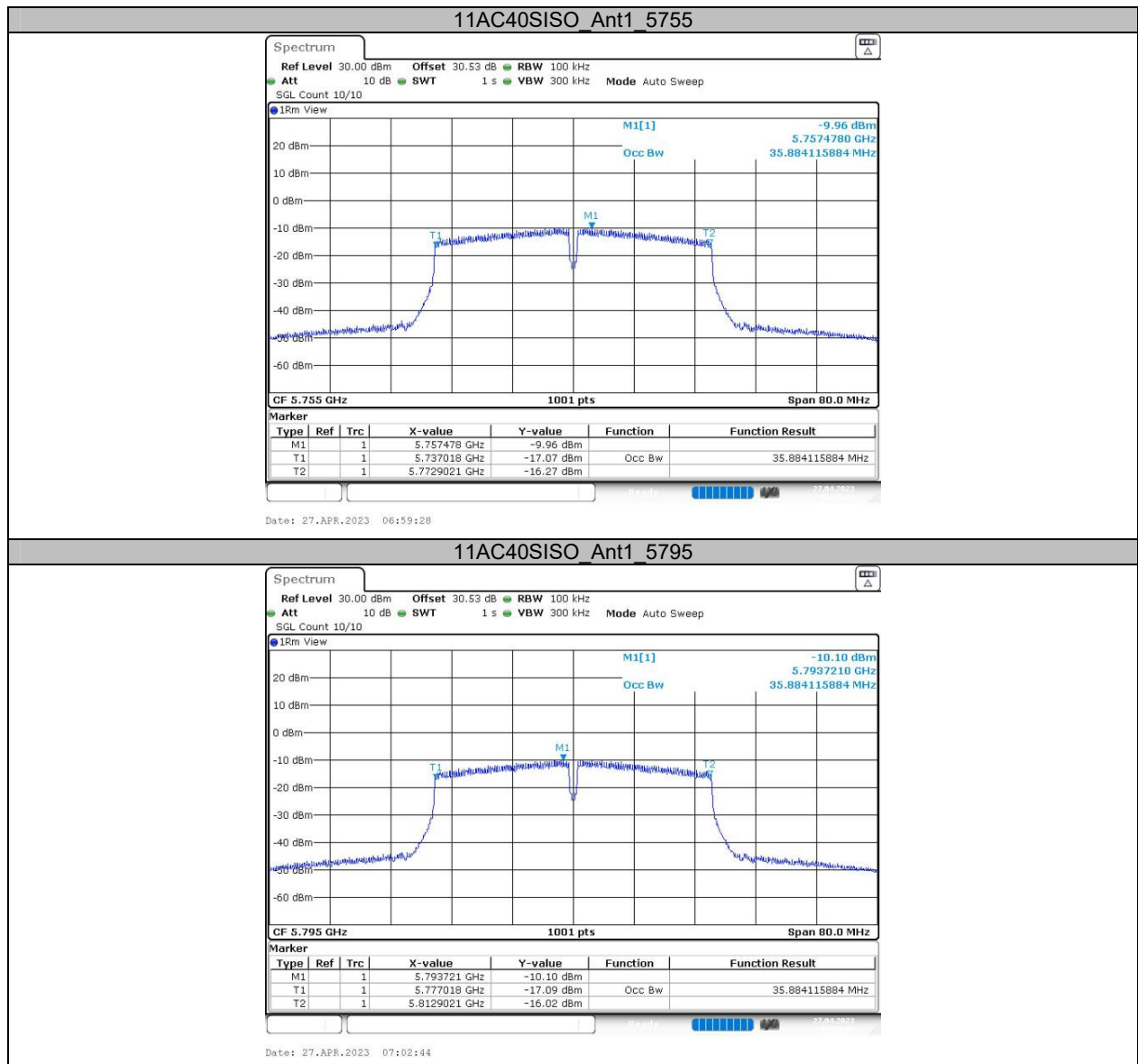
TestMode	Antenna	Channel	OCB[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	16.344	16 to 20	PASS
		5785	16.344	16 to 20	PASS
		5825	16.344	16 to 20	PASS
11AC20SISO	Ant1	5745	17.542	16 to 20	PASS
		5785	17.542	16 to 20	PASS
		5825	17.542	16 to 20	PASS
11AC40SISO	Ant1	5755	35.884	32 to 40	PASS
		5795	35.884	32 to 40	PASS

# Test Graphs









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