



RF TEST REPORT

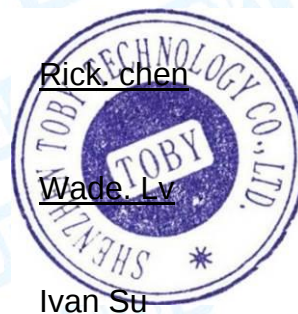
Certificate No. : TBC-C-202412-0109-1
Report No. : TBR-C-202412-0109-43
Applicant : NEO Smart Technology (GuangDong) Co., LTD
Equipment Under Test (EUT)
EUT Name : Water Valve
Model No. : NAS-WV07W
Series Model No. : NAS-WV07W6-2, NAS-WV08W, NAS-WV09W, NAS-WV10W, NAS-WV11W
Brand Name : NEO
Receipt Date : 2024-12-13
Test Date : 2024-12-13 to 2025-01-06
Issue Date : 2025-01-07
Standards : ETSI EN 300 440 V2.2.1:2018
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above. The EUT technically complies with the Council Directive 2014/53/EU relating to radio equipment.

Tested By : Rick.chen

Reviewed By : Wade.Lv

Approved By : IVAN SU



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TBR-C-202412-0109-43	Rev.01	Initial issue of report	2025-01-07



1 General Information

1.1 Client Information

Applicant	:	NEO Smart Technology (GuangDong) Co., LTD
Address	:	Floor 7, 8, 9, 10, Building 28, No. 29, Licheng Industrial Avenue, Shuikou Street, Huicheng District, Huizhou City, China
Manufacturer	:	NEO Smart Technology (GuangDong) Co., LTD
Address	:	Floor 7, 8, 9, 10, Building 28, No. 29, Licheng Industrial Avenue, Shuikou Street, Huicheng District, Huizhou City, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Water Valve	
Model No.	:	NAS-WV07W, NAS-WV07W6-2, NAS-WV08W, NAS-WV09W, NAS-WV10W, NAS-WV11W	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is Appearance.	
Product Description	:	Operation Frequency:	5G WIFI Band 4: 5745MHz~5825 MHz
		Number of Channel:	Please see the note (2)
		Antenna Type:	1.36dBi Copper tube antenna
		Modulation Type:	802.11a: OFDM (QPSK, BPSK, 16QAM) 802.11n: OFDM (QPSK, BPSK, 16QAM, 64QAM)
Power Rating	:	Adapter(XSC-0502000AEUU) INPUT: 100-240V~50/60Hz 0.4A Max OUTPUT: 5.0V/2.0A 10.0W DC 3.6V Rechargeable Li-ion battery	
Software Version	:	----	
Hardware Version	:	NAS-WV07W6-V4-2024.06.18	
Remark: The antenna gain and adapter provided by the applicant, the verified for the RF conduction test provided by TOBY test lab. The above antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.			

Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

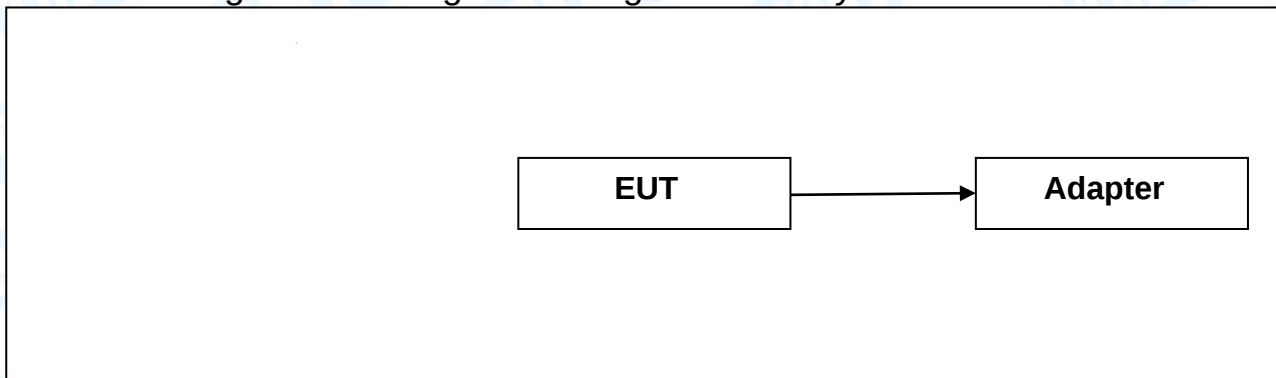


(2) Channel List:

5G Band 5745~5825 MHz				
Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5745~5825 MHz	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz
Remark: For 20 MHz Bandwidth, use channel 149, 153, 157, 161, 165. For 40 MHz Bandwidth, use channel 151, 159. For 80 MHz Bandwidth, use channel 155				

(3) Antenna information is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested



1.4 Description of Support Units

The EUT has been test as an independent unit.



1.5 Description of Operating Mode

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Software: UI_mptool			
Test Mode: Continuously transmitting			
Test Band 4: (5745~5825 MHz)			
Mode	Data Rate	Channel	Parameters
802.11a	OFDM/ 6Mbps	149	89
	OFDM/ 6Mbps	157	89
	OFDM/ 6Mbps	165	89
802.11n(HT20)	MCS 0	149	89
	MCS 0	157	89
	MCS 0	165	89
802.11n(HT40)	MCS 0	151	89
	MCS 0	159	89

The EUT system operated these modes were found to be the worst case during the pre-scanning test as Following:

For Radiated Test(Below 1GHz)
Transmit mode(802.11 a 5745MHz)
Receive mode(5745MHz)
For Radiated Test(Above 1GHz)
Transmit mode(802.11a 5745/5825MHz)
Receive mode(5745/5825MHz)
Note: the report only show the worst case data.

	Normal Test Conditions	Extreme Test Conditions
Temperature	15°C~35°C	1°C~60°C
Humidity	20%~75%	N/A
Supply Voltage	DC 5V	DC 4.5V~DC 5.5V



Note :

- (1) For tests at extreme temperatures, measurements shall be made in accordance with the procedures specified in clause 5.7.1.2(EN 300 440), at the upper and lower temperatures of the range as follows:

General	-20°C to +55°C
Portable	-10°C to +55°C
Normal indoor use	+5°C to +35°C

(2) **Mains voltage:**

The extreme test voltages for equipment to be connected to an ac mains source shall be the nominal mains voltage $\pm 10\%$. For equipment that operates over a range of mains voltages clause 5.7.2.4 applies.

Battery power sources:

When the radio equipment is intended for operation from the usual type of battery power sources the extreme test voltages shall be 1,3 and 0,9 multiplied by the nominal voltage of the battery (6 V, 12 V, etc.). For float charge applications using "gel-cell" type batteries the extreme voltage shall be 1,15 and 0,85 multiplied by the nominal voltage of the declared battery voltage.

Power sources using other types of batteries:

The lower extreme test voltages for equipment with power sources using batteries shall be as follows:

- for equipment with a battery indicator, the end point voltage as indicated;
- for equipment without a battery indicator the following end point voltages shall be used:
 - for the Leclanché or the lithium type of battery:
0,85 multiplied by the nominal voltage of the battery;
 - for the nickel-cadmium type of battery:
0,9 multiplied by the nominal voltage of the battery;
 - for other types of battery or equipment, the lower extreme test voltage for the discharged condition shall be declared by the equipment manufacturer.

The nominal voltage is considered to be the upper extreme test voltage in this case.



1.6 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test Item	Expanded Uncertainty (U_{Lab})
RF Power-Conducted	± 0.95 dB
Radiated Emission (30MHz to 1000 MHz)	± 4.40 dB
Radiated Emission (Above 1000MHz)	± 4.20 dB
Temperature	$\pm 0.6^{\circ}\text{C}$
Humidity	$\pm 4\%$
ERP (Radiated)	± 3.84 dB
Conducted Spurious Emission	± 2.72 dB
Frequency Error	$\pm 52.45\text{Hz}$
Occupied Bandwidth	$\pm 3.8\%$
Power Density	± 0.92 dB

1.7 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.



2 Test Results Summary

Harmonised Standard ETSI EN 300 440					
No	Description	Clause No.	U/C	Condition	Results
Transmitter Items					
1	e.i.r.p	4.2.2	C	Applies to all devices with transmitters	PASS
2	Permitted range of operating frequencies	4.2.3	C	Applies to all devices with transmitters	PASS
3	Unwanted emissions in the spurious domain	4.2.4	C	Applies to all devices with transmitters	PASS
4	Duty cycle	4.2.5	C	Transmitting devices which do not use LBT, DAA, or RFID transmitters operating in the 2 446 to 2 454 MHz band transmitting more than 500 mW e.i.r.p. power level	N/A _{note(1)}
5	Additional requirements for FHSS equipment	4.2.6	C	Equipment utilizing FHSS modulation	N/A _{note(2)}
Receiver Items					
6	Adjacent channel selectivity	4.3.3	C	Applies to equipment Category 1 receivers	N/A
7	Blocking or desensitization	4.3.4	C	Applies to category 1, 2, and 3 SRD communication media receivers	PASS
8	Spurious radiations	4.3.5	C	Applies to all receivers, except receivers used in combination with permanently co-located transmitters continuously transmitting	PASS
9	Spectrum access techniques	4.4	C	Equipment which are not using duty cycle restrictions for media access	N/A
10	GBSAR antenna pattern	4.6.4	C	Applies only GBSAR systems	N/A
11	Limits for GBSAR	Annex I	C	Applies only GBSAR systems	N/A
Note: N/A is an abbreviation for Not Applicable and means this test item is not applicable for this device according to the technology characteristic of device. “U/C”: Indicates whether the requirement is unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C). Note (1): Not applicable, This requirement applies to RFID transmitters operating in 2446MHz to 2454 MHz only. Note (2): Not applicable, since the test applies to FHSS Device only Note (3): Not applicable, since the test applies to class 1 receivers only Note (4): Not applicable, since the test applies to class 1 and class 2 receivers only					

3 Test Software

Test Item	Test Software	Manufacturer	Version No.
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
Radiation Emission	EZ-EMC	EZ	FA-03A2RE+
RF Test System	JS1120-3	Tonscend	V3.2.22



4 Test Equipment and Test Site

Test Site				
No.	Test Site	Manufacturer	Specification	Used
TB-EMCSR001	Shielding Chamber #1	YIHENG	7.5*4.0*3.0 (m)	X
TB-EMCSR002	Shielding Chamber #2	YIHENG	8.0*4.0*3.0 (m)	√
TB-EMCCA001	3m Anechoic Chamber #A	ETS	9.0*6.0*6.0 (m)	X
TB-EMCCB002	3m Anechoic Chamber #B	YIHENG	9.0*6.0*6.0 (m)	√

Radiation Emission Test (B Site)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	N9020A	MY49100060	Aug. 29, 2024	Aug. 28, 2025
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jun. 17, 2024	Jun. 16, 2025
EMI Test Receiver	Rohde & Schwarz	ESU-8	100472/008	Feb. 23, 2024	Feb. 22, 2025
Bilog Antenna	SCHWARZBECK	VULB 9168	1225	Nov. 13, 2023	Nov. 12, 2025
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2463	Jun. 14, 2024	Jun. 13, 2026
Horn Antenna	SCHWARZBECK	BBHA 9170	1118	Feb. 27, 2024	Feb. 26, 2026
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jun. 14, 2024	Jun. 13, 2026
HF Amplifier	Tonscend	TAP9E6343	AP21C806117	Aug. 29, 2024	Aug. 28, 2025
HF Amplifier	Tonscend	TAP051845	AP21C806141	Aug. 29, 2024	Aug. 28, 2025
HF Amplifier	Tonscend	TAP0184050	AP21C806129	Aug. 29, 2024	Aug. 28, 2025
Highpass Filter	CD	HPM-6.4/18G	---	N/A	N/A
Highpass Filter	CD	HPM-2.8/18G	---	N/A	N/A
Highpass Filter	XINBO	XBLBQ-HTA67(8-25G)	22052702-1	N/A	N/A

Antenna Conducted Emission

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jun. 17, 2024	Jun. 16, 2025
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Aug. 29, 2024	Aug. 28, 2025
MXA Signal Analyzer	KEYSIGHT	N9020B	MY60110172	Aug. 29, 2024	Aug. 28, 2025
MXA Signal Analyzer	Agilent	N9020A	MY47380425	Aug. 29, 2024	Aug. 28, 2025
Vector Signal Generator	Agilent	N5182A	MY50141294	Aug. 29, 2024	Aug. 28, 2025
Analog Signal Generator	Agilent	N5181A	MY48180463	Aug. 29, 2024	Aug. 28, 2025
Vector Signal Generator	KEYSIGHT	N5182B	MY59101429	Aug. 29, 2024	Aug. 28, 2025
Analog Signal Generator	KEYSIGHT	N5173B	MY61252685	Aug. 29, 2024	Aug. 28, 2025
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Aug. 29, 2024	Aug. 28, 2025
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Aug. 29, 2024	Aug. 28, 2025
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Aug. 29, 2024	Aug. 28, 2025
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	N/A	N/A
RF Control Unit	Tonsced	JS0806-1	21C8060380	Aug. 29, 2024	Aug. 28, 2025
RF Control Unit	Tonsced	JS0806-2	21F8060439	N/A	N/A
Power Control Box	Tonsced	JS0806-4ADC	21C8060387	Aug. 29, 2024	Aug. 28, 2025



Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	144382	Feb. 23, 2024	Feb. 22, 2025
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	168796	Jun. 14, 2024	Jun. 13, 2026
Temperature and Humidity Chamber	ZhengHang	ZH-QTH-1500	ZH2107264	Jun. 17, 2024	Jun. 16, 2025



5 Equivalent Isotropic Radiated Power (e.i.r.p)

5.1 Test Standard and Limit

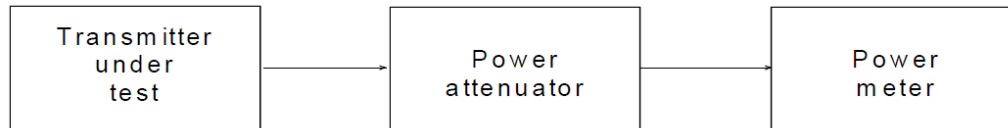
5.1.1 Test Standard

ETSI EN 300 440 V2.2.1:2018 clause 4.2.2

5.1.2 Test Limit

Frequency Bands	Power	Application
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
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices
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
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Non-specific short range devices and Radio determination devices

5.2 Test Setup



5.3 Test Procedure

Step 1:

- using a suitable means, the output of the transmitter shall be coupled to a matched diode detector;
- the output of the diode detector shall be connected to the vertical channel of an oscilloscope;
- the combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the envelope peaks and the duty cycle of the transmitter output signal;
- the observed duty cycle of the transmitter (Tx on/(Tx on + Tx off)) shall be noted as x, (0 < x < 1) and recorded.

Step 2:

- the average output power of the transmitter shall be determined using a wideband, calibrated RF power meter with a matched thermocouple detector or an equivalent thereof and, where applicable, with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be recorded as "A" (in dBm);
- the e.i.r.p. shall be calculated from the above measured power output A, the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:

$$- P = A + G + 10 \log (1/x);$$

5.4 Deviation From Test Standard

No deviation

5.5 Test Data

Please refer to the Attachment A.



6 Permitted Range of Operating Frequencies

6.1 Test Standard and Limit

6.1.1 Test Standard

ETSI EN 300 440 V2.2.1:2018 clause 4.2.3

6.1.2 Test Limit

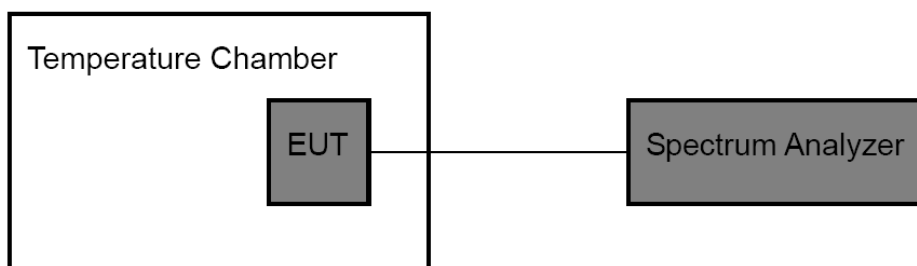
The width of the power spectrum envelope is $f_H - f_L$ for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by the lowest value of f_L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

Frequency Bands	Power	Application
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
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	Radio Frequency Identification (RFID) devices
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
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Non-specific short range devices and Radio determination devices

6.2 Test Setup



6.3 Test Procedure

- a) Put the spectrum analyser in video averaging mode with a minimum of 50 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 4.2.3. 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 4.2.3. 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.

6.4 Deviation From Test Standard

No deviation

6.5 Test Data

Please refer to the Attachment B.



7 Unwanted Emissions in The Spurious Domain

7.1 Test Standard and Limit

7.1.1 Test Standard

ETSI EN 300 440 V2.2.1:2018 clause 4.2.4

7.1.2 Test Limit

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 (cabinetradiation); 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 1000 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 1000 MHz the quasi-peak detector set in accordance with the specification of CISPR 16 [1], [2] and [3] shall be used.

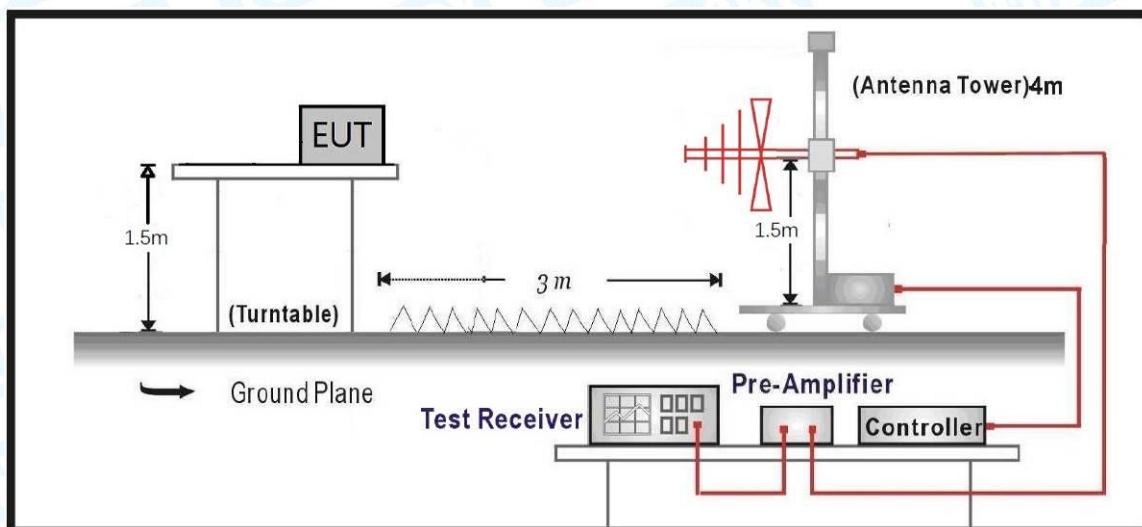
The correction for RBW described in clause 5.8.5 is to be applied to the measured results as applicable.

Spurious emissions Limit

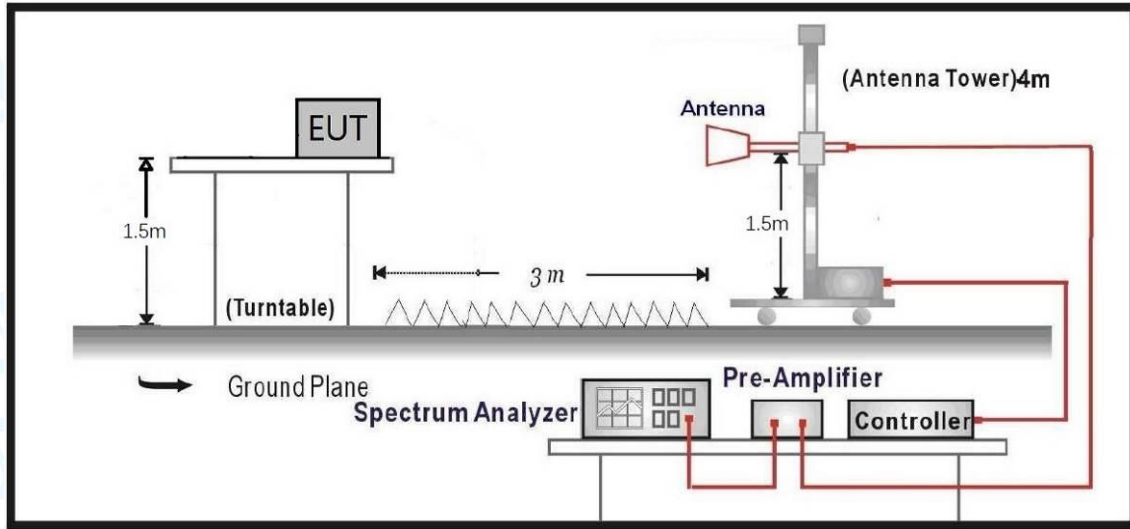
Frequency ranges	47MHz to 74MHz 87.5MHz to 108MHz 174MHz to 230MHz 470MHz to 862MHz	Other frequencies $\leq 1000\text{MHz}$	Frequencies $> 1000\text{MHz}$
State			
Operating	4nW(-54dBm)	250nW(-36dBm)	1uW(-30dBm)
Standby	2nW(-57dBm)	2nW(-57dBm)	20nW(-47dBm)

7.2 Test Setup

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz.



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz.



7.3 Test Procedure

Refer to EN 300 440, clause 4.2.4.3 for the test conditions and the measurement method.

7.4 Deviation From Test Standard

No deviation

7.5 Test Data

Please refer to the Attachment C.



8 Adjacent channel selectivity

8.1 Test Standard and Limit

8.1.1 Test Standard

ETSI EN 300 440 V2.2.1:2018 clause 4.3.3

8.1.2 Test Limit

The adjacent channel selectivity of the equipment under specified conditions shall not be less than $-30 \text{ dBm} + k$. The correction factor, k , is as follows:

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

Where:

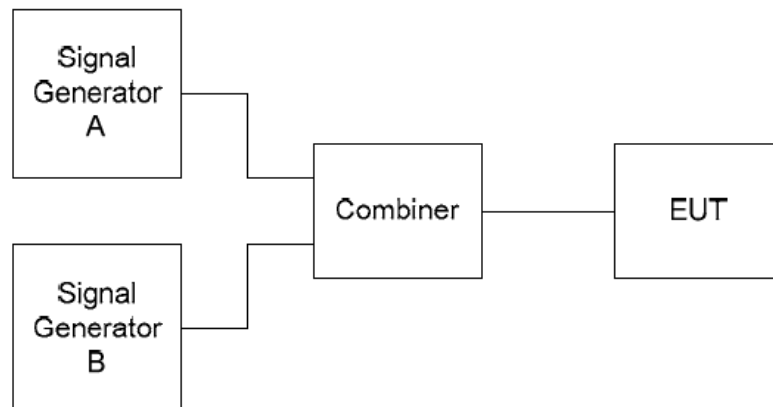
- f is the frequency in GHz;
- BW is the channel bandwidth in MHz.

The factor k is limited within the following:

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

The measured adjacent channel selectivity shall be stated in the test report.

8.2 Test Setup



8.3 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 the adjacent channel centre frequency immediately above that of the wanted signal.

Initially signal generator B shall be switched off and using signal generator A the level that 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 measurements shall be repeated with signal generator B unmodulated and adjusted to the adjacent channel centre immediately below the wanted signal.

The adjacent channel selectivity shall be recorded for the upper and lower adjacent channels as the level in dBm of the unwanted signal.

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 adjacent selectivity shall be recorded as the level in dBm of lowest level of the unwanted signal (generator B) resulting in a non-read of the tag.

8.4 Deviation From Test Standard

No deviation

8.5 Test Data

N/A



9 Blocking or desensitization

9.1 Test Standard and Limit

9.1.1 Test Standard

ETSI EN 300 440 V2.2.1:2018 clause 4.3.4

9.1.2 Test Limit

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:

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

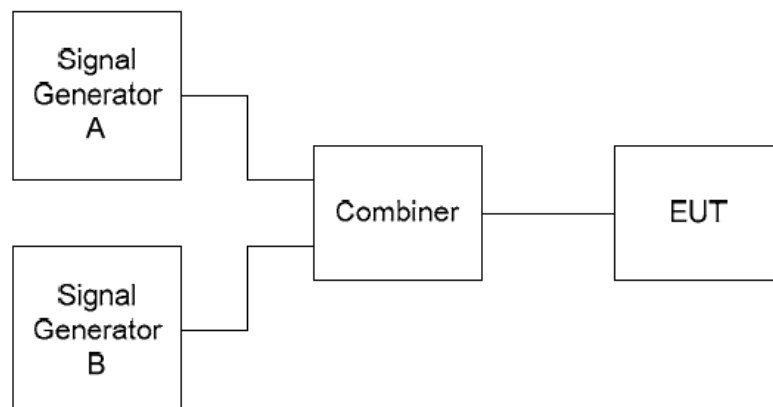
Where:

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

The factor k is limited within the following:

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

9.2 Test Setup



9.3 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.

9.4 Deviation From Test Standard

No deviation

9.5 Test Data

Please refer to the Attachment D.



10 Spurious Emissions

10.1 Test Standard and Limit

10.1.1 Test Standard

ETSI EN 300 440 V2.2.1:2018 clause 4.2.4

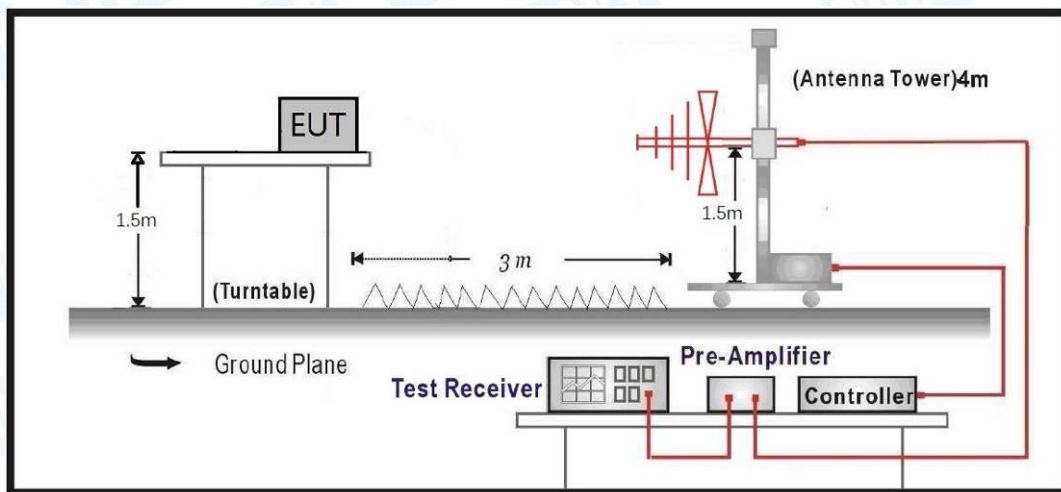
10.1.2 Test Limit

The spurious emissions of the receiver shall not exceed the values given in table.

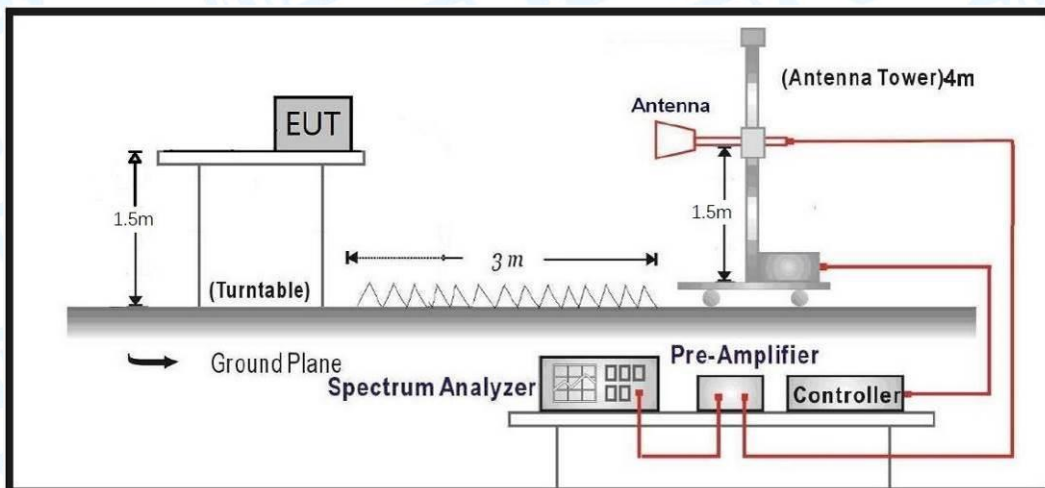
Frequency Range	Maximum Power
25MHz ~ 1GHz	2nW(-57dBm)
Above 1GHz	20nW(-47dBm)

10.2 Test Setup

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz.



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz.



10.3 Test Procedure

Refer to EN 300 440, clause 4.3.5.3 for the test conditions and the measurement method.

10.4 Deviation From Test Standard

No deviation

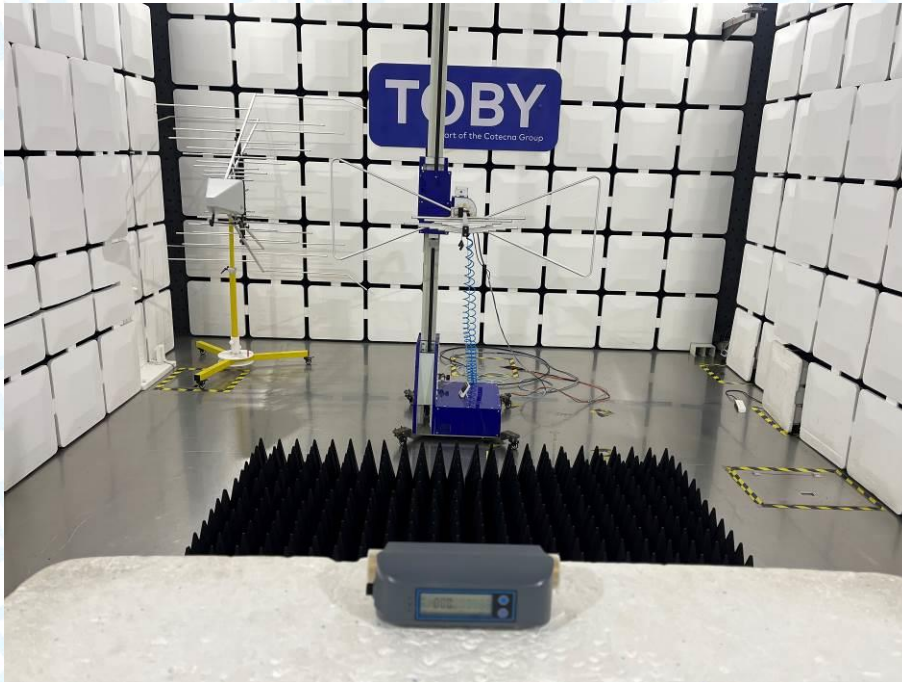
10.5 Test Data

Please refer to the Attachment E.



11 Photographs--Test Setup

Radiated Spurious Emission (Below 1 GHz)



Radiated Spurious Emission (Above 1 GHz)



Attachment A--Equivalent Isotropic Radiated Power (e.i.r.p)

Test Condition	Test Mode	Ant.	Frequency [MHz]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
NTNV	11A	Ant1	5745	10.73	13.98	PASS
NTNV	11A	Ant1	5785	10.32	13.98	PASS
NTNV	11A	Ant1	5825	10.57	13.98	PASS
NTNV	11N20SISO	Ant1	5745	10.61	13.98	PASS
NTNV	11N20SISO	Ant1	5785	10.17	13.98	PASS
NTNV	11N20SISO	Ant1	5825	10.76	13.98	PASS
NTNV	11N40SISO	Ant1	5755	10.99	13.98	PASS
NTNV	11N40SISO	Ant1	5795	10.34	13.98	PASS

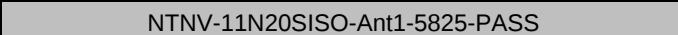
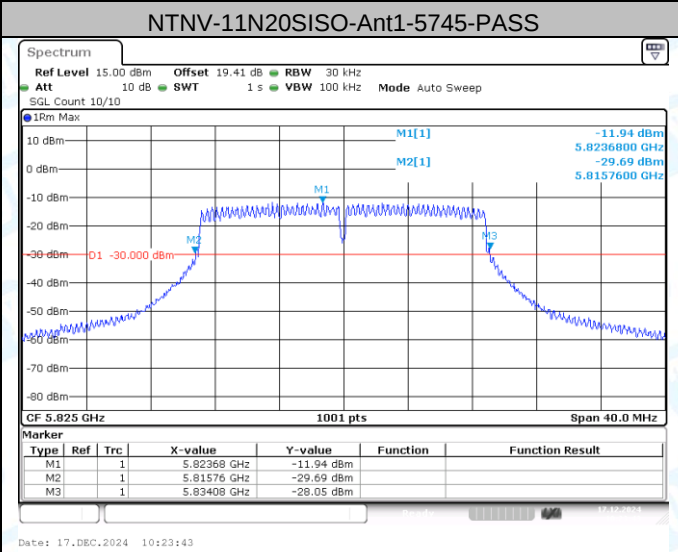
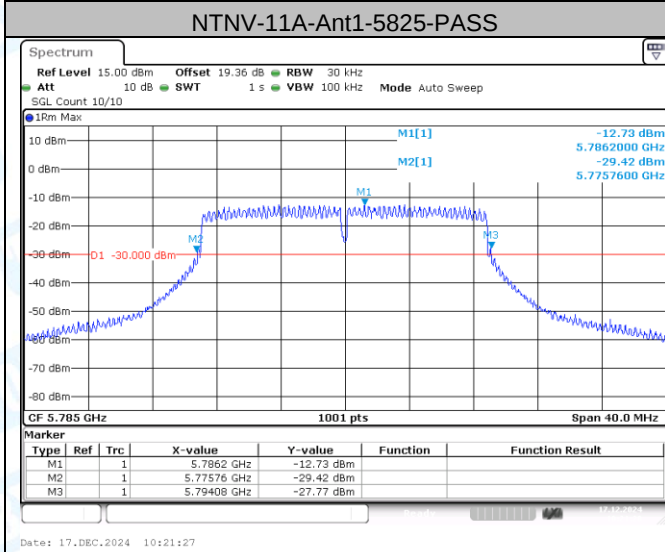
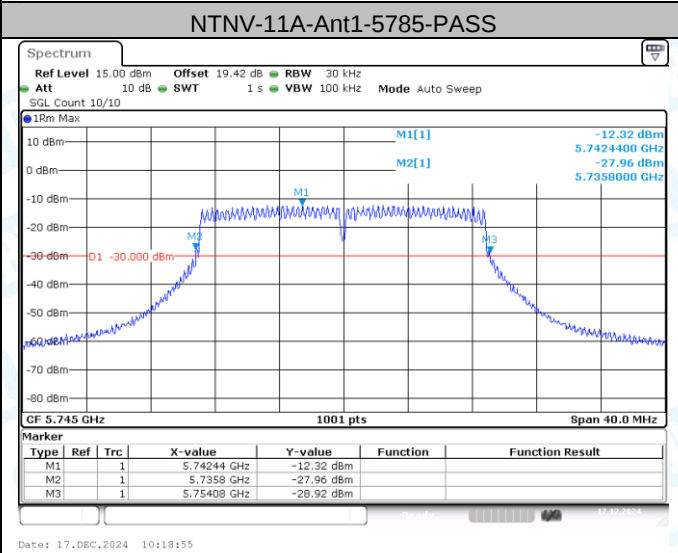
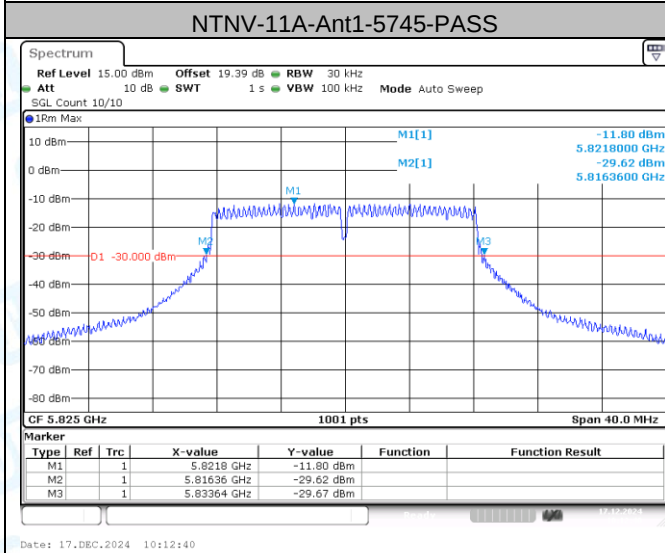
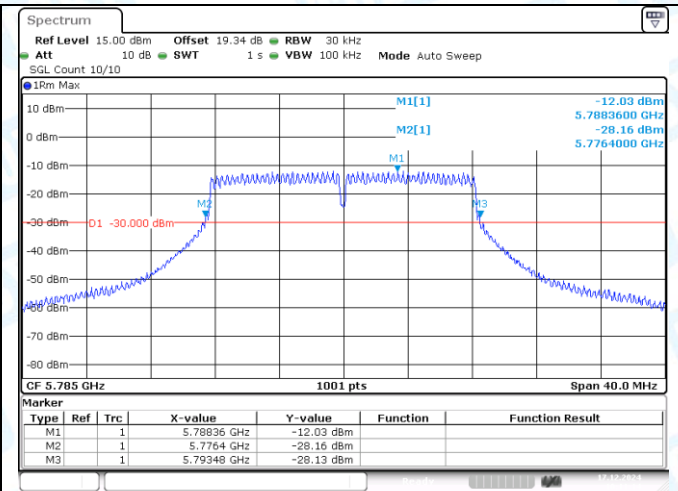
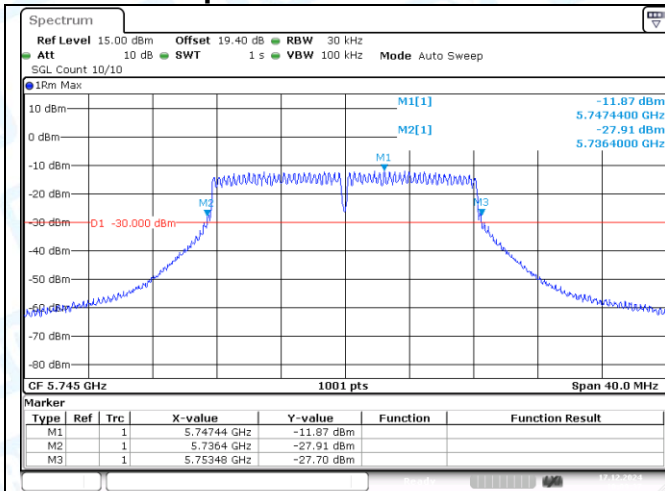


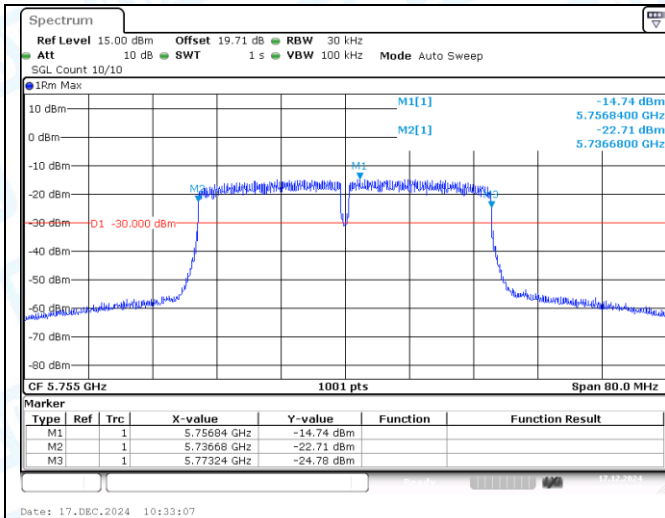
Attachment B--Permitted Range of Operating Frequencies

Test Condition	Test Mode	Antenna	Frequency [MHz]	FL [MHz]	FH[MHz]	Limit[MHz]	Verdict
NTNV	11A	Ant1	5745	5736.40	5753.48	5725 to 5850	PASS
NTNV	11A	Ant1	5785	5776.40	5793.48	5725 to 5850	PASS
NTNV	11A	Ant1	5825	5816.36	5833.64	5725 to 5850	PASS
NTNV	11N20SISO	Ant1	5745	5735.80	5754.08	5725 to 5850	PASS
NTNV	11N20SISO	Ant1	5785	5775.76	5794.08	5725 to 5850	PASS
NTNV	11N20SISO	Ant1	5825	5815.76	5834.08	5725 to 5850	PASS
NTNV	11N40SISO	Ant1	5755	5736.68	5773.24	5725 to 5850	PASS
NTNV	11N40SISO	Ant1	5795	5776.68	5813.24	5725 to 5850	PASS

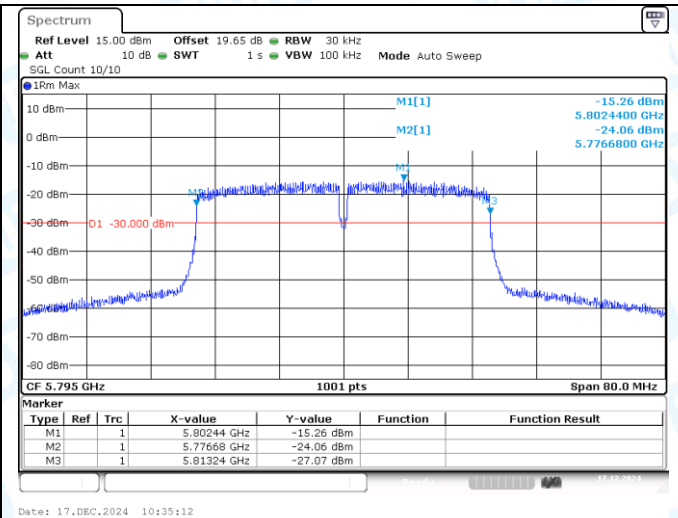


Test Graphs





NTNV-11N40SISO-Ant1-5755-PASS

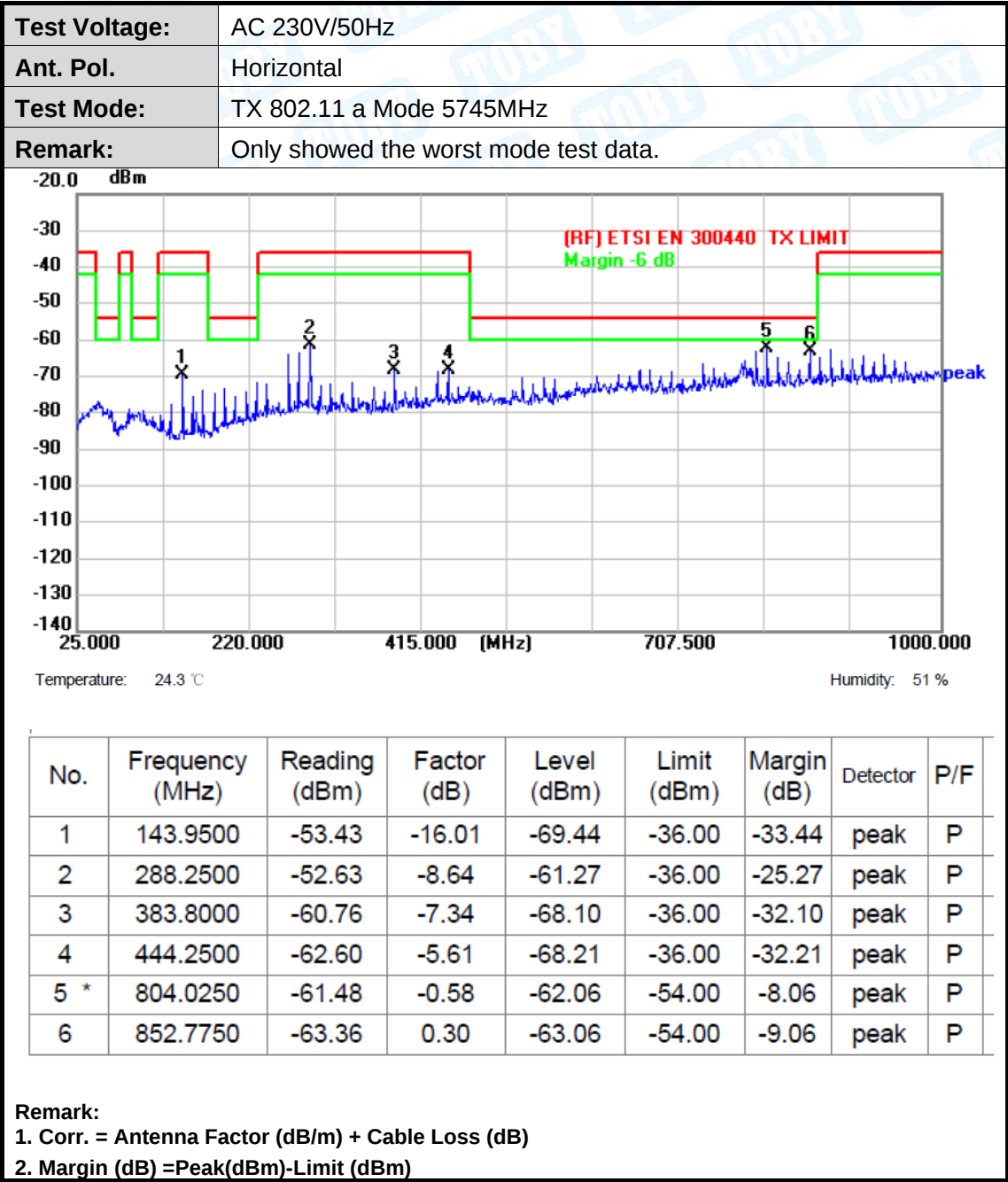


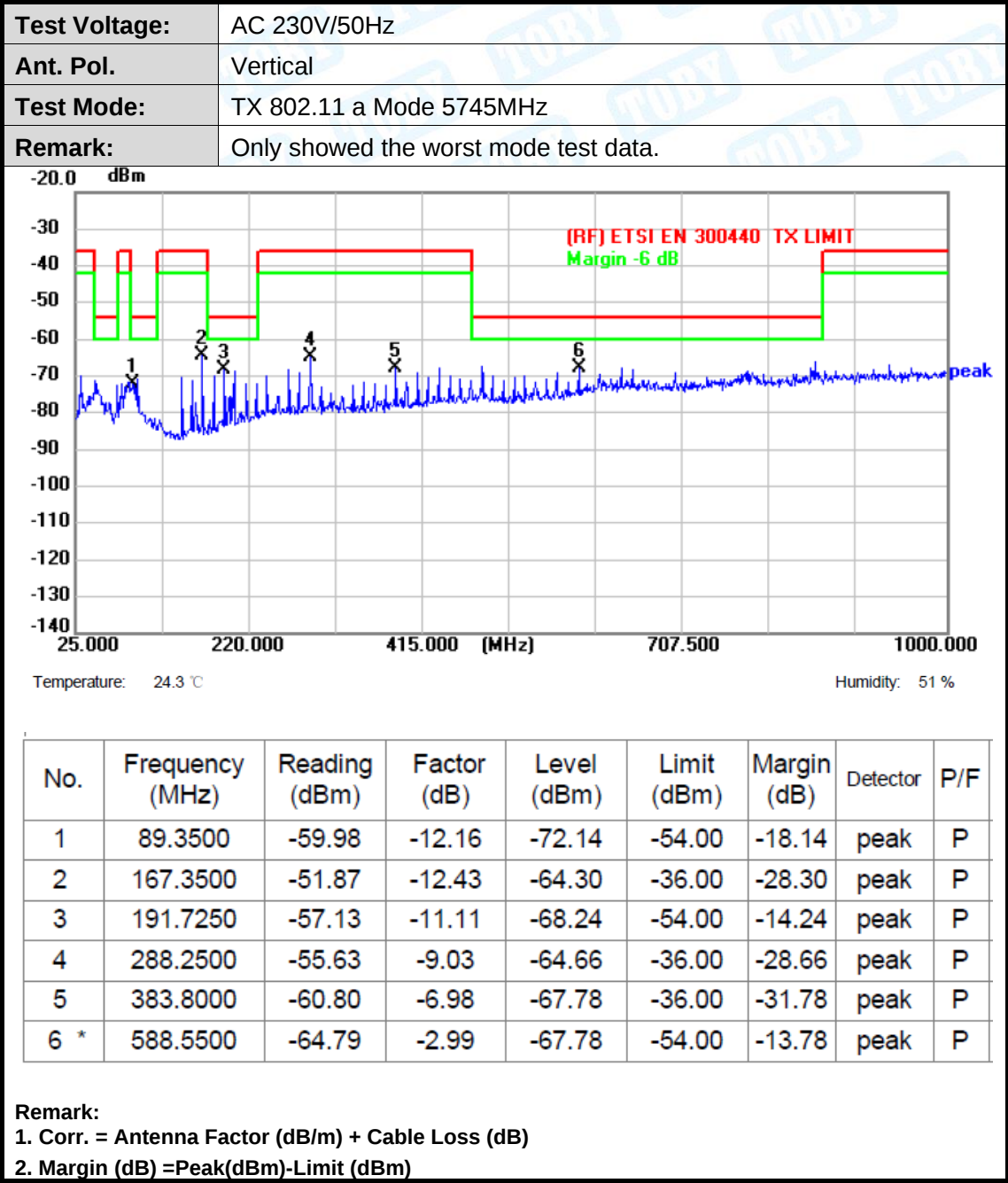
NTNV-11N40SISO-Ant1-5795-PASS



Attachment C--Unwanted Emissions in The Spurious Domain

Below 1 G



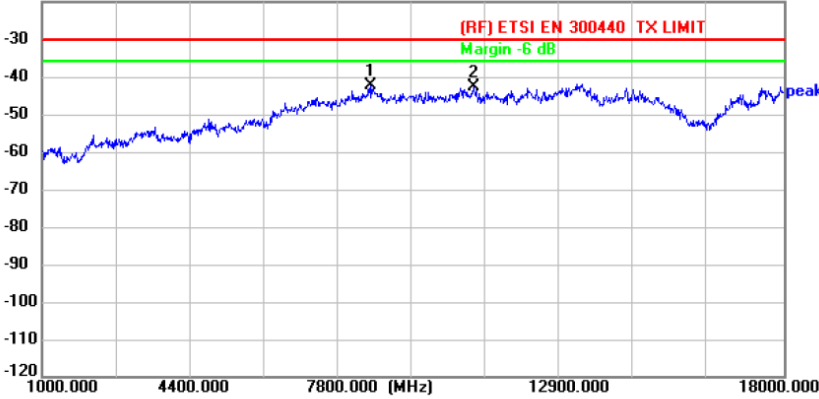


Above 1 GHz

Only showed the worst mode test data.

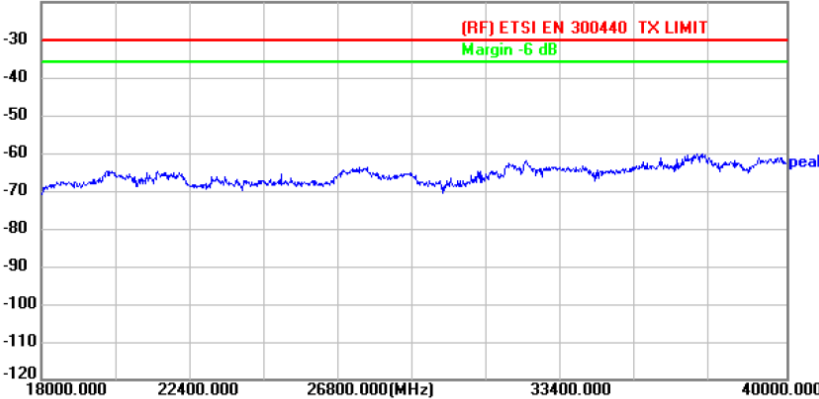
Test Voltage:	AC 230V/50Hz
Ant. Pol.	Horizontal
Test Mode:	TX 802.11 a Mode 5745MHz
Remark:	No report for the emission which below the prescribed limit.

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1 *	8531.000	-58.86	16.53	-42.33	-30.00	-12.33	peak	P
2	10911.000	-63.13	20.37	-42.76	-30.00	-12.76	peak	P

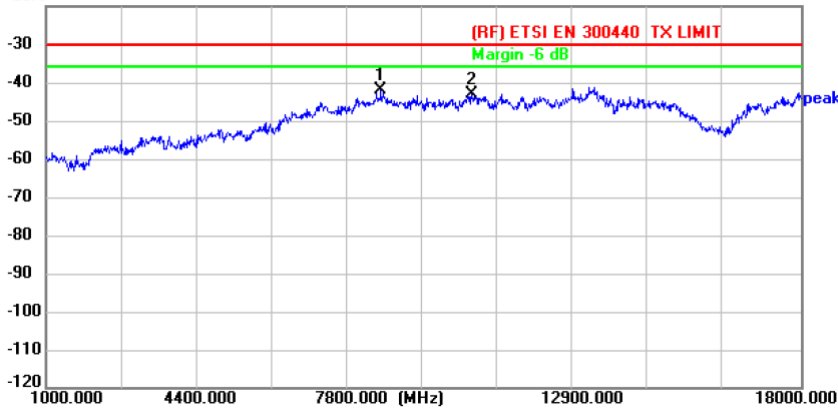
Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) =Peak(dBm)-Limit (dBm)
3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.
4. No report for the emission which below the prescribed limit.



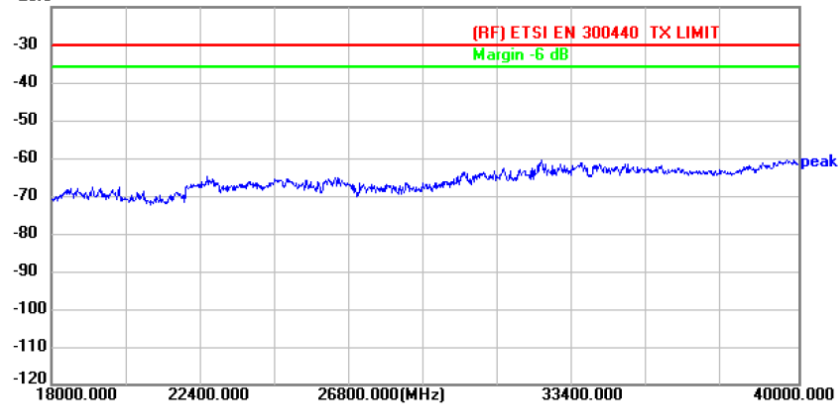
Test Voltage:	AC 230V/50Hz
Ant. Pol.	Vertical
Test Mode:	TX 802.11 a Mode 5745MHz
Remark:	No report for the emission which below the prescribed limit.

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1 *	8548.000	-58.11	16.21	-41.90	-30.00	-11.90	peak	P
2	10588.000	-62.45	19.40	-43.05	-30.00	-13.05	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Margin (dB) =Peak(dBm)-Limit (dBm)

3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.

4. No report for the emission which below the prescribed limit.



Test Voltage:	AC 230V/50Hz
Ant. Pol.	Horizontal
Test Mode:	TX 802.11 a Mode 5825MHz
Remark:	No report for the emission which below the prescribed limit.

-20.0 dBm

Temperature: 24.3 °C Humidity: 51 %

-20.0 dBm

Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1	8497.000	-59.78	16.52	-43.26	-30.00	-13.26	peak	P
2 *	10809.000	-62.44	19.48	-42.96	-30.00	-12.96	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Margin (dB) =Peak(dBm)-Limit (dBm)

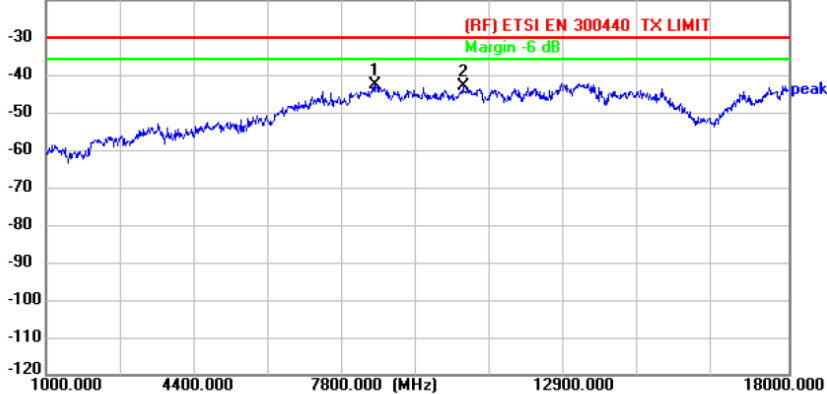
3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.

4. No report for the emission which below the prescribed limit.



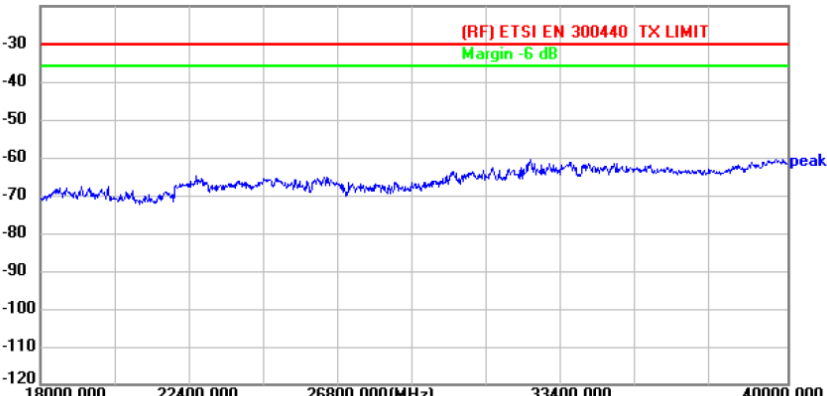
Test Voltage:	AC 230V/50Hz
Ant. Pol.	Vertical
Test Mode:	TX 802.11 a Mode 5825MHz
Remark:	No report for the emission which below the prescribed limit.

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1 *	8548.000	-58.74	16.21	-42.53	-30.00	-12.53	peak	P
2	10554.000	-62.01	19.15	-42.86	-30.00	-12.86	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Margin (dB) =Peak(dBm)-Limit (dBm)

3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.

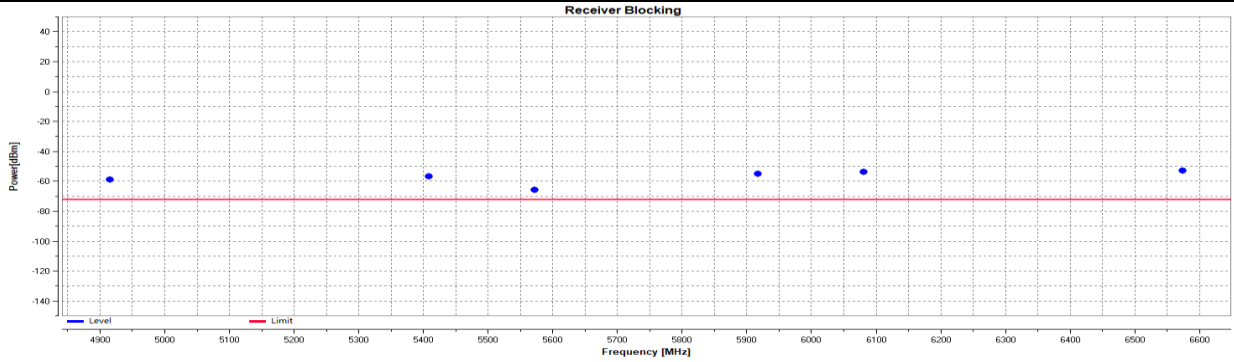
4. No report for the emission which below the prescribed limit.



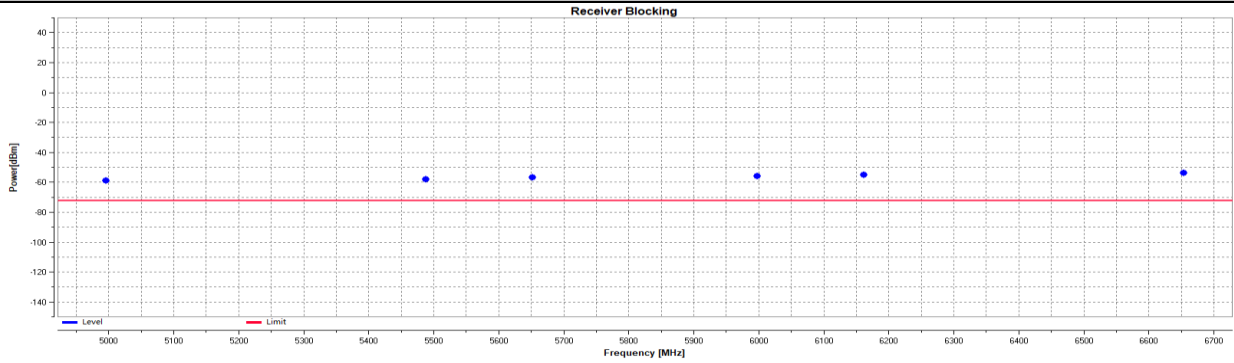
Attachment D--Blocking or Desensitization

Receiver category 2								
Test Mode	Antenna	Frequency [MHz]	Wanted SignalLevel [dBm]	Freq. [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Verdict
11A	Ant1	5745	-89.00	4915.5283	-50	-59.00	-72.34	PASS
11A	Ant1	5745	-89.00	5408.2483	-20	-57.00	-72.34	PASS
11A	Ant1	5745	-89.00	5572.4883	-10	-66.00	-72.34	PASS
11A	Ant1	5745	-89.00	5917.3918	10	-55.00	-72.34	PASS
11A	Ant1	5745	-89.00	6081.6318	20	-54.00	-72.34	PASS
11A	Ant1	5745	-89.00	6574.3518	50	-53.00	-72.34	PASS
11A	Ant1	5825	-88.00	4995.5283	-50	-59.00	-72.46	PASS
11A	Ant1	5825	-88.00	5488.2483	-20	-58.00	-72.46	PASS
11A	Ant1	5825	-88.00	5652.4883	-10	-57.00	-72.46	PASS
11A	Ant1	5825	-88.00	5997.3918	10	-56.00	-72.46	PASS
11A	Ant1	5825	-88.00	6161.6318	20	-55.00	-72.46	PASS
11A	Ant1	5825	-88.00	6654.3518	50	-54.00	-72.46	PASS
Note: $k = -20\log f - 10\log BW$ - f is the frequency in GHz; - BW is the occupied bandwidth in MHz. Receiver category 2 Limit=-45dBm+k Only show the worst case data.								

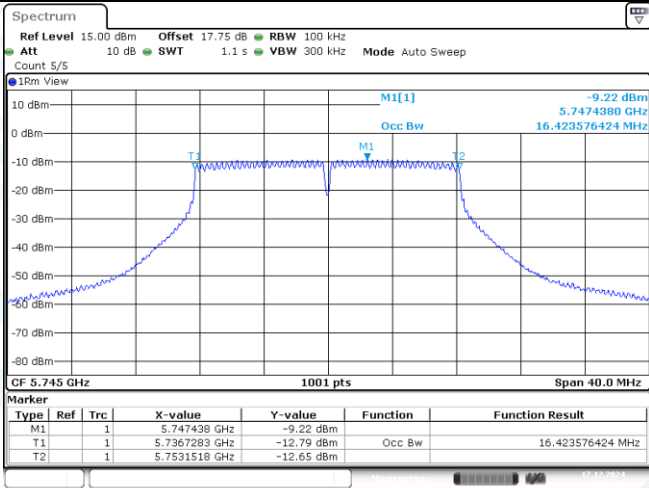




NTNV-11A-Ant1-5745-PASS

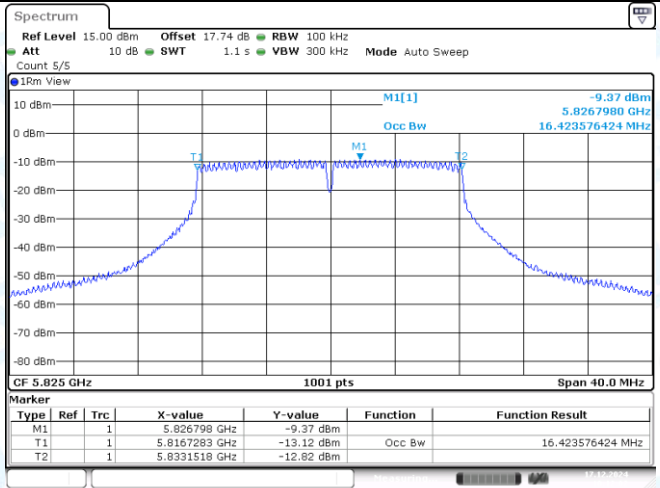


NTNV-11A-Ant1-5825-PASS



Date: 17.DEC.2024 10:09:07

11A-Ant1-5745-PASS



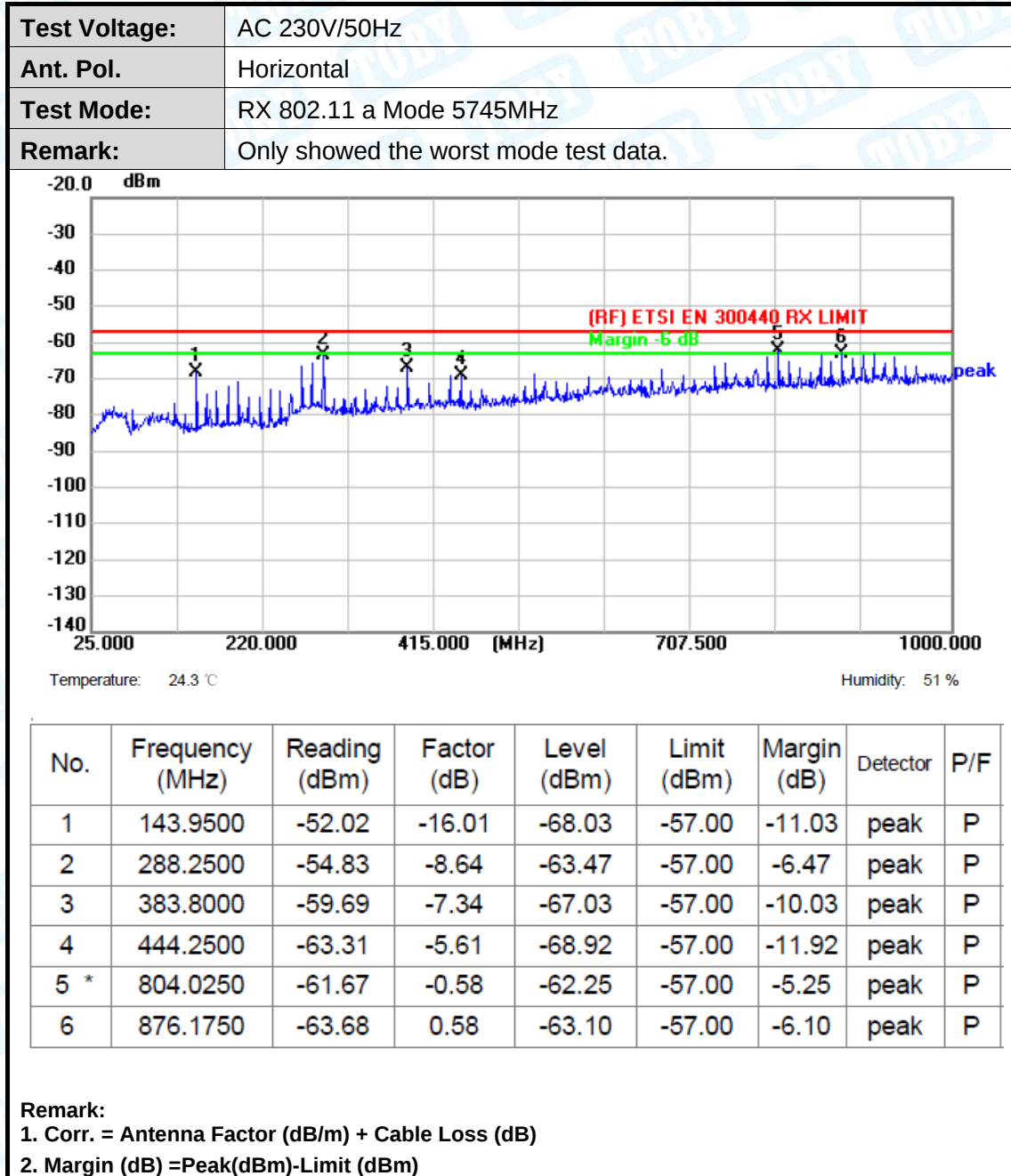
Date: 17.DEC.2024 10:12:02

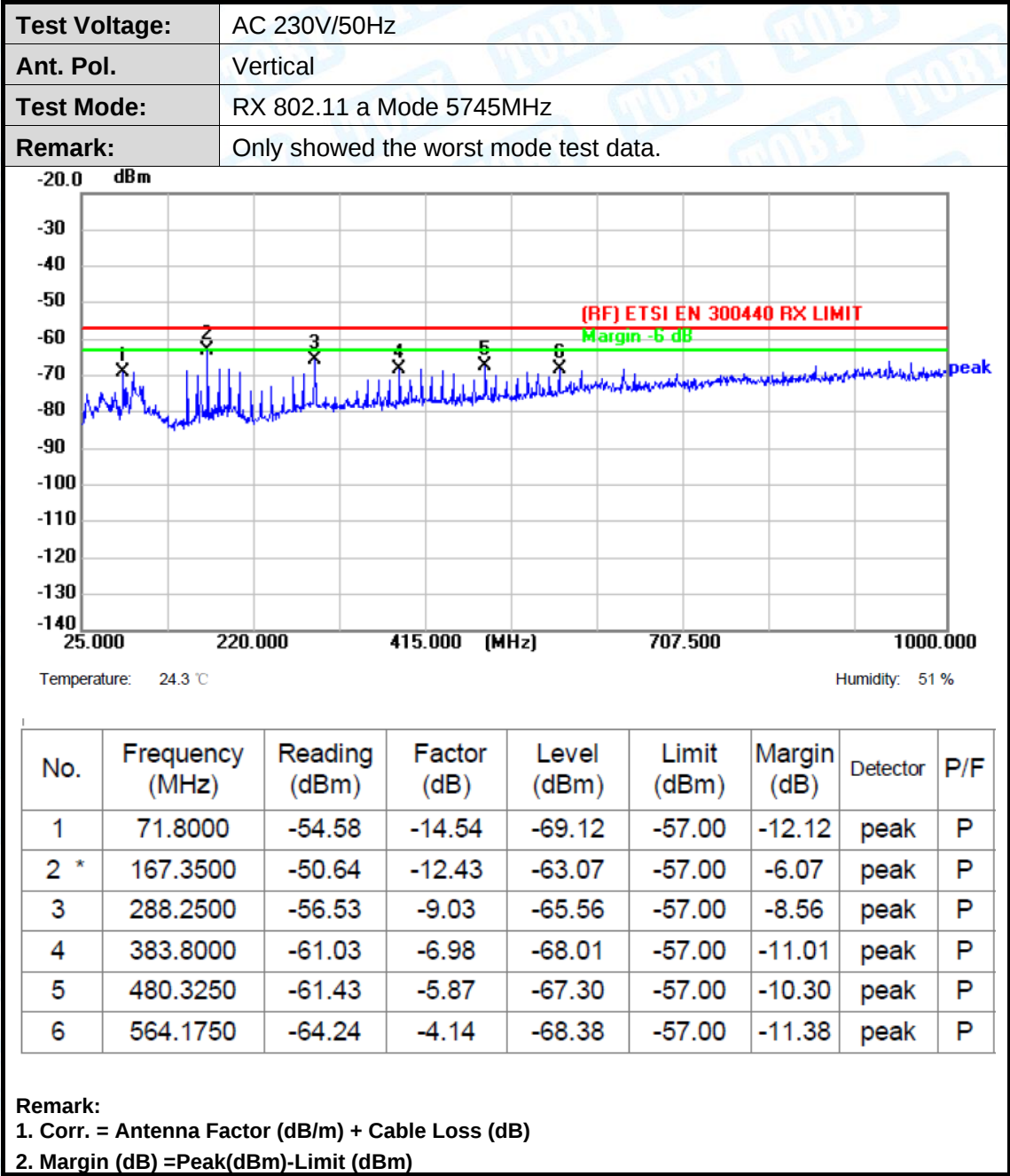
11A-Ant1-5825-PASS



Attachment E--Spurious Emissions of the Receiver

Below 1 G





Above 1 GHz

Only showed the worst mode test data.

Test Voltage:	AC 230V/50Hz
Ant. Pol.	Horizontal
Test Mode:	RX 5745MHz
Remark:	No report for the emission which below the prescribed limit.

Temperature: 24.3 °C Humidity: 51 %

Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1	11727.000	-67.32	11.27	-56.05	-47.00	-9.05	peak	P
2 *	13240.000	-69.08	13.38	-55.70	-47.00	-8.70	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Margin (dB) = Peak(dBm) - Limit (dBm)
3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.
4. No report for the emission which below the prescribed limit.



Test Voltage:	AC 230V/50Hz
Ant. Pol.	Vertical
Test Mode:	RX 5745MHz
Remark:	No report for the emission which below the prescribed limit.

-20.0 dBm

(RF) ETSI EN 300440 RX LIMIT

Margin -6 dB

1

2

peak

1000.000 4400.000 7800.000 (MHz) 12900.000 18000.000

Temperature: 24.3 °C Humidity: 51 %

-20.0 dBm

(RF) ETSI EN 300440 RX LIMIT

Margin -6 dB

peak

18000.000 22400.000 26800.000(MHz) 33400.000 40000.000

Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1	10452.000	-64.71	8.76	-55.95	-47.00	-8.95	peak	P
2 *	13393.000	-68.32	13.27	-55.05	-47.00	-8.05	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Margin (dB) =Peak(dBm)-Limit (dBm)

3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.

4. No report for the emission which below the prescribed limit.



Test Voltage:	AC 230V/50Hz
Ant. Pol.	Horizontal
Test Mode:	RX 5825MHz
Remark:	No report for the emission which below the prescribed limit.

-20.0 dBm

(RF) ETSI EN 300440 RX LIMIT

Margin -6 dB 2

peak

1000.000 4400.000 7800.000 [MHz] 12900.000 18000.000

Temperature: 24.3 °C Humidity: 51 %

-20.0 dBm

(RF) ETSI EN 300440 RX LIMIT

Margin -6 dB

peak

18000.000 22400.000 26800.000 [MHz] 33400.000 40000.000

Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1	10826.000	-65.54	9.68	-55.86	-47.00	-8.86	peak	P
2 *	13342.000	-67.90	13.61	-54.29	-47.00	-7.29	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Margin (dB) =Peak(dBm)-Limit (dBm)

3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.

4. No report for the emission which below the prescribed limit.



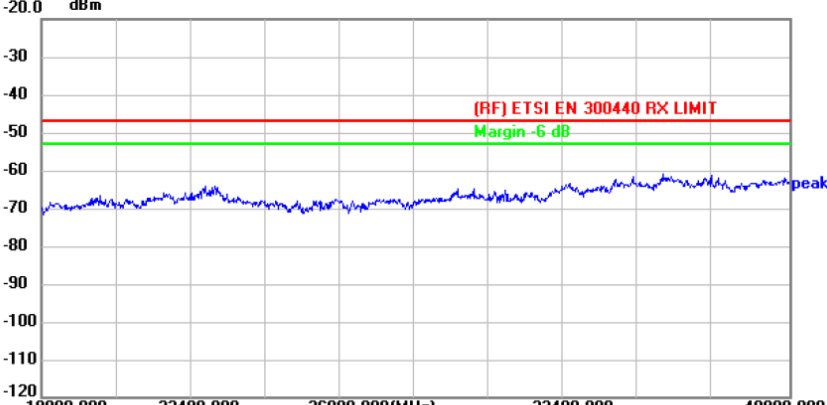
Test Voltage:	AC 230V/50Hz
Ant. Pol.	Vertical
Test Mode:	RX 5825MHz
Remark:	No report for the emission which below the prescribed limit.

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

-20.0 dBm



Temperature: 24.3 °C Humidity: 51 %

No.	Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dB)	Detector	P/F
1 *	10690.000	-64.15	9.56	-54.59	-47.00	-7.59	peak	P
2	13376.000	-68.13	13.26	-54.87	-47.00	-7.87	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Margin (dB) =Peak(dBm)-Limit (dBm)

3. The tests evaluated 1~40GHz, Test with filter (Pass Frequency: 8-25G). and 18GHz-40GHz is the noise, No other signals were detected.

4. No report for the emission which below the prescribed limit.

-----END OF THE REPORT-----

