

Test Report

Applicant : LAN-YOU INTELLIGENT CONNECTION
TECHNOLOGY CO.,LTD.
Address : ROOM 117, 1F, BUILDING1, 15 FENGSHEN
AVENUE, HUADU DISTRICT, GUANGZHOU,
GUANGDONG, CHINA
Product Name : TELEMATIC BOX
Brand Mark : N/A
Model : TCU GEN2.5-0J 4G
Report Number : BLA-EMC-202511-A9903
Date of Receipt : Dec. 2, 2025
Date of Test : Dec. 2, 2025 to Jan. 7, 2026
Test Standard : ETSI EN 300328 V2.2.2 (2019-07)
Test Result : Pass

Compiled by: *Hugh*Review by: *Xavier*Approved by: *Blue Zheng*

Issued Date: Jan. 7, 2026

BlueAsia Technical Services (Shenzhen) Co., LtdAddress: No.41, South of Beihuan Road, Shangwu Community, Shiyuan
Subdistrict, Bao'an District, Shenzhen, Guangdong, China

The test report is effective only with both signature and specialized stamp and The result(s) shown in this report refer only to the sample(s) tested. Without written approval of BlueAsia, this report can't be reproduced except in full. The results described in this report do not represent the quality or characteristics of the sampled batch, nor do they represent any similar or identical products that are not explicitly stated.

Table of Contents

1	General information	4
1.1	General information	4
1.2	General description of EUT	4
2	Test summary	5
3	Test Configuration	6
3.1	Test mode	6
3.2	Operation Frequency each of channel	7
3.3	Test channel	7
3.4	Configuration diagram of EUT	7
3.5	Test environment	8
3.6	Auxiliary equipment	8
4	Laboratory information	9
4.1	Laboratory and accreditations	9
4.2	Measurement uncertainty	9
5	Test equipment	10
6	Test result	12
6.1	RF Output Power	12
6.2	Power Spectral Density	13
6.3	Occupied Channel Bandwidth	14
6.4	Transmitter unwanted emissions in the out-of-band domain	15
6.5	Transmitter unwanted emissions in the spurious domain	16
6.6	Receiver spurious emissions	27
6.7	Receiver Blocking	38
7	Appendix A	41
7.1	Test data	41
	Appendix B: photographs of test setup	56
	Appendix C: photographs of EUT	57

Revise Record

Version No.	Date	Description
01	Jan. 7, 2026	Original

BlueAsia

1 General information

1.1 General information

Applicant	LAN-YOU INTELLIGENT CONNECTION TECHNOLOGY CO.,LTD.
Address	ROOM 117,1F, BUILDING1,15 FENGSHEN AVENUE, HUADU DISTRICT, GUANGZHOU, GUANGDONG,CHINA
Manufacturer	LAN-YOU INTELLIGENT CONNECTION TECHNOLOGY CO.,LTD.
Address	ROOM 117,1F, BUILDING1,15 FENGSHEN AVENUE, HUADU DISTRICT, GUANGZHOU, GUANGDONG,CHINA
Factory	Katolec Automotive Systems(Guangzhou)Co., Ltd.
Address	No.3 Xingda Road, Huangpu, Guangzhou City, Guangdong, China

1.2 General description of EUT

Product name	TELEMATIC BOX
Model no.	TCU GEN2.5-0J 4G
Series model	N/A
Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK
Rate data:	1Mbps; 2Mbps
Channel Spacing:	2MHz
Number of Channels:	40
Antenna Type:	External antenna
Antenna Gain:	2.3dBi(Provided by customer)
Power supply	DC9-16V
Hardware version	N/A
Software version	N/A

Note: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2 Test summary

No.	Test Item	Test Requirement	Test Method	Result	Remark
1	RF Output Power	EN 300 328 Clause 4.3.2.2	EN 300 328 V2.2.2 clause 5.4.2.2.1.2	Pass	
2	Power Spectral Density	EN 300 328 Clause 4.3.2.3	EN 300 328 V2.2.2 clause 5.4.3.2.1	Pass	
3	Occupied Channel Bandwidth	EN 300 328 Clause 4.3.2.7	EN 300 328 V2.2.2 clause 5.4.7.2.1	Pass	
4	Transmitter unwanted emissions in the OOB domain	EN 300 328 Clause 4.3.2.8	EN 300 328 V2.2.2 clause 5.4.8.2.1	Pass	
5	Transmitter unwanted emissions in the spurious domain	EN 300 328 Clause 4.3.2.9	EN 300 328 V2.2.2 clause 5.4.9.2	Pass	
6	Receiver spurious emissions	EN 300 328 Clause 4.3.2.10	EN 300 328 V2.2.2 clause 5.4.10.2	Pass	
7	Receiver Blocking	EN 300 328 Clause 4.3.2.11	EN 300 328 V2.2.2 clause 5.4.11.2	Pass	

3 Test Configuration

3.1 Test mode

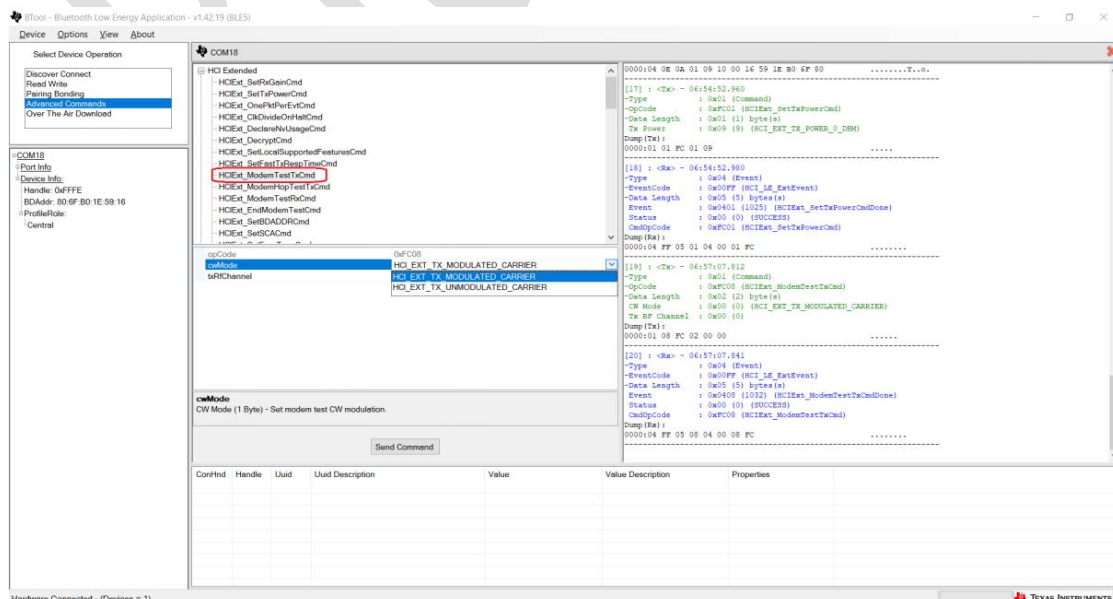
Test Mode ^{Note 1}	Description
TX	Keep the EUT in continuously transmitting with modulation mode.
RX	Keep the EUT in receiving mode
TX Low channel	Keep the EUT in continuously transmitting mode in low channel
TX middle channel	Keep the EUT in continuously transmitting mode in middle channel
TX high channel	Keep the EUT in continuously transmitting mode in high channel

Note 1: The EUT was configured to measure its highest possible emission and/or immunity level. The test modes were adapted according to the operation manual for use; the EUT was operated in the engineering mode ^{Note 2} to fix the TX or Rx frequency that was for the purpose of the measurements.

Note 2: Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

Power level setup in software			
Test Software Name	BTool-Bluetooth Low Energy Application -v1.42.19 (BLE5)		
Mode	Channel	Frequency (MHz)	Soft Set
GFSK	CH00	2402	TX level : default
	CH20	2442	
	CH39	2480	

Run Software



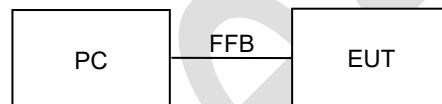
3.2 Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

3.3 Test channel

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2442MHz
The Highest channel	2480MHz

3.4 Configuration diagram of EUT



3.5 Test environment

Temperature	Normal	25°C
	Low Extreme	-20°C
	High Extreme	+70°C
Voltage	Normal	DC 12V
	Low Extreme	DC 9V
	High Extreme	DC 16V

3.6 Auxiliary equipment

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	Lenovo	E460C	N/A	N/A
Note: “--” mean no any auxiliary device during testing.				

4 Laboratory information

4.1 Laboratory and accreditations

The test facility is recognized, certified, or accredited by the following organizations:

Company name:	BlueAsia Technical Services (Shenzhen) Co.,Ltd.
Address:	No.41, South of Beihuan Road, Shangwu Community, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Registration No.:	L9788
Telephone:	+86-755-28682673
FAX:	+86-755-28682673

4.2 Measurement uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

Parameter	Expanded Uncertainty
Radiated Emission(9kHz-30MHz)	$\pm 4.34\text{dB}$
Radiated Emission(30Mz-1000MHz)	$\pm 4.24\text{dB}$
Radiated Emission(1GHz-18GHz)	$\pm 4.68\text{dB}$
AC Power Line Conducted Emission(150kHz-30MHz)	$\pm 3.45\text{dB}$
Occupied Channel Bandwidth	$\pm 5\%$
RF output power, conducted	$\pm 1.5\text{ dB}$
Power Spectral Density, conducted	$\pm 3.0\text{ dB}$
Unwanted Emissions, conducted	$\pm 3.0\text{ dB}$
Temperature	$\pm 3\text{ }^{\circ}\text{C}$
Supply voltages	$\pm 3\%$
Time	$\pm 5\%$

5 Test equipment

Radiated Spurious Emissions (Below 1GHz)

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-002-01	Anechoic chamber	9*6*6 chamber	SKET	N/A	2024/3/27	2027/3/26
BLA-EMC-002-02	Control room	966 control room	SKET	N/A	2024/3/27	2027/3/26
BLA-EMC-009	EMI receiver	ESR7	R&S	101199	2025/08/05	2026/08/04
BLA-EMC-043	Loop antenna	FMZB1519B	Schwarzbeck	00102	2024/06/29	2026/06/28
BLA-EMC-065	Broadband antenna	VULB9168	Schwarzbeck	01065P	2024/06/29	2026/06/27
BLA-XC-01	Coaxial Cable	N/A	BlueAsia	V01	N/A	N/A
BLA-XC-02	Coaxial Cable	N/A	BlueAsia	V02	N/A	N/A

Radiated Spurious Emissions (Above 1GHz)

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-001-01	Anechoic chamber	9*6*6 chamber	SKET	N/A	2023/11/16	2026/11/15
BLA-EMC-001-02	Control Room	966 control room	SKET	N/A	2025/11/16	2027/11/15
BLA-EMC-008	Spectrum	FSP40	R&S	100817	2025/08/05	2026/08/04
BLA-EMC-012	Broadband antenna	VULB9168	Schwarzbeck	00836 P:00227	2025/10/12	2028/10/11
BLA-EMC-013	Horn Antenna	BBHA9120D	Schwarzbeck	01892	2024/06/29	2026/06/28
BLA-EMC-014	Amplifier	PA_000318G-45	SKET	PA201804 3003	2025/08/05	2026/08/04
BLA-EMC-046	Filter bank	2.4G/5G Filter bank	SKET	N/A	2025/06/09	2026/06/08
BLA-EMC-061	Receiver	ESPI7	R&S	101477	2025/06/09	2026/06/08
BLA-EMC-066	Amplifier	LNPA_30M01 G-30	SKET	SK202106 0801	2025/06/09	2026/06/08
BLA-EMC-086	Amplifier	LNPA_18G40 G-50dB	SKET	SK202207 1301	2025/06/09	2026/06/08
BLA-EMC-087	Horn Antenna	BBHA 9170	Schwarzbeck	1106	2024/06/29	2026/06/28
BLA-XC-03	Coaxial Cable	N/A	BlueAsia	V03	N/A	N/A
BLA-XC-04	Coaxial Cable	N/A	BlueAsia	V04	N/A	N/A

RF conducted

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-003-003	Shield room	5*3*3	SKET	N/A	2025/11/16	2027/11/15
BLA-EMC-016	Signal Generator	N5182A	Agilent	MY52420567	2025/06/09	2026/06/08
BLA-EMC-038	Spectrum	N9020A	Agilent	MY49100060	2025/08/05	2026/08/04
BLA-EMC-042	Power sensor	RPR3006 W	DARE	14I00889SN 042	2025/08/05	2026/08/04
BLA-EMC-044	Radio communication tester	CMW500	R&S	132429	2025/08/05	2026/08/04

BLA-EMC-064	Signal Generator	N5182B	KEYSIGHT	MY58108892	2025/06/09	2026/06/08
BLA-EMC-079	Spectrum	N9020A	Agilent	MY54420161	2025/08/05	2026/08/04
BLA-EMC-088	Audio Analyzer	ATS-1	Audio Precision	ATS141094	2025/06/09	2026/06/08
BLA-EMC-100	Digital Radio Tester	RWC2010	Redwoodcom m	RWC201024 90304	2025/06/09	2026/06/08

Test Software Record:

Software No.	Software Name	Manufacture	Software version	Test site
BLA-EMC-S001	EZ-EMC	EZ	EEMC-3A1+	RE
BLA-EMC-S002	EZ-EMC	EZ	EEMC-3A1+	RE
BLA-EMC-S010	MTS 8310	MW	2.0.0.0	RF

6 Test result

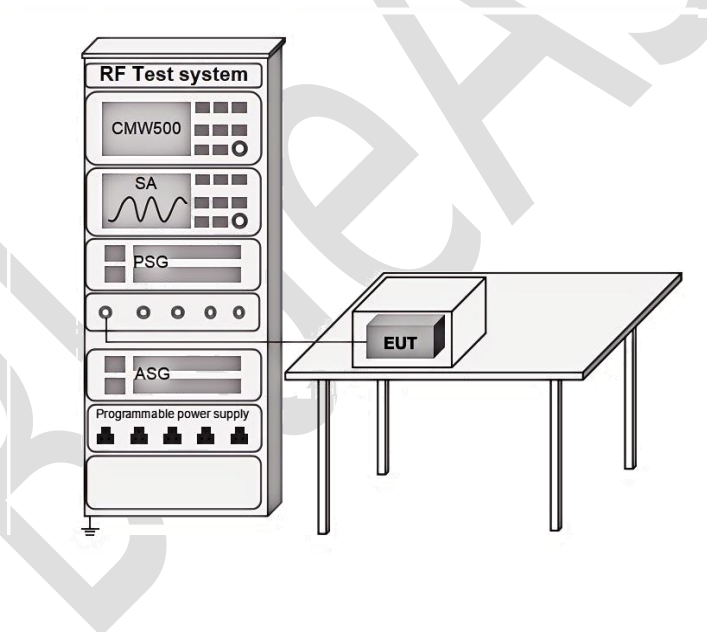
6.1 RF Output Power

Test Standard	ETSI EN 300328 V2.2.2 (2019-07)
Test Method	EN 300 328 V2.2.2 clause 5.4.2.2.1.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.1.1 Limit

$\leq 20\text{dBm}/(100\text{mw})$ (e.i.r.p)

6.1.2 Test setup



6.1.3 Test data

Pass: Please refer to appendix A for details

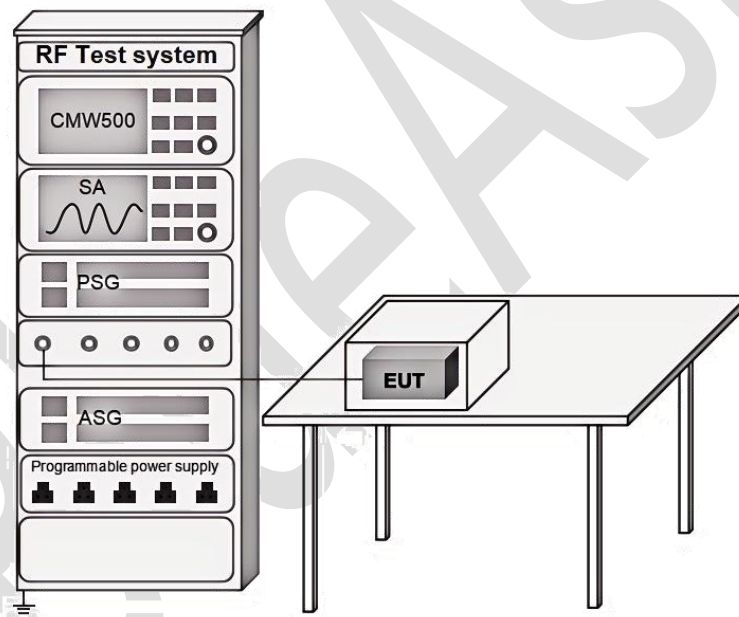
6.2 Power Spectral Density

Test Standard	ETSI EN 300328 V2.2.2 (2019-07)
Test Method	EN 300 328 V2.2.2 clause 5.4.3.2.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.2.1 Limit

$\leq 10\text{dBm}$ per MHz

6.2.2 Test setup



6.2.3 Test data

Pass: Please refer to appendix A for details

6.3 Occupied Channel Bandwidth

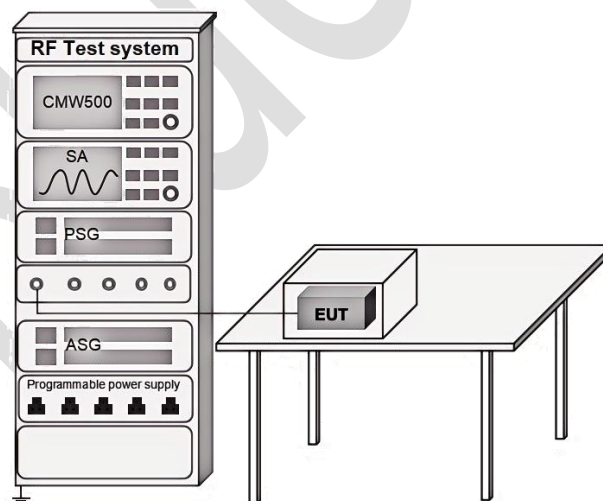
Test Standard	ETSI EN 300328 V2.2.2 (2019-07)
Test Method	EN 300 328 V2.2.2 clause 5.4.7.2.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.3.1 Limit

The Occupied Channel Bandwidth shall fall completely within the band given in clause 1. For non-adaptive Frequency Hopping equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than the Nominal Channel Bandwidth declared by the manufacturer. See clause 5.4.1 j). This declared value shall not be greater than 5 MHz.

The Occupied Channel Bandwidth shall fall completely within the band given in table 1. In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p. greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

6.3.2 Test setup



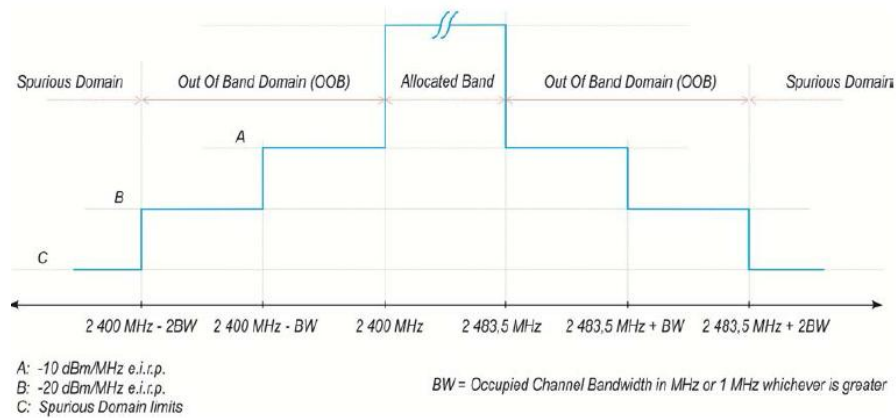
6.3.3 Test data

Pass: Please refer to appendix A for details.

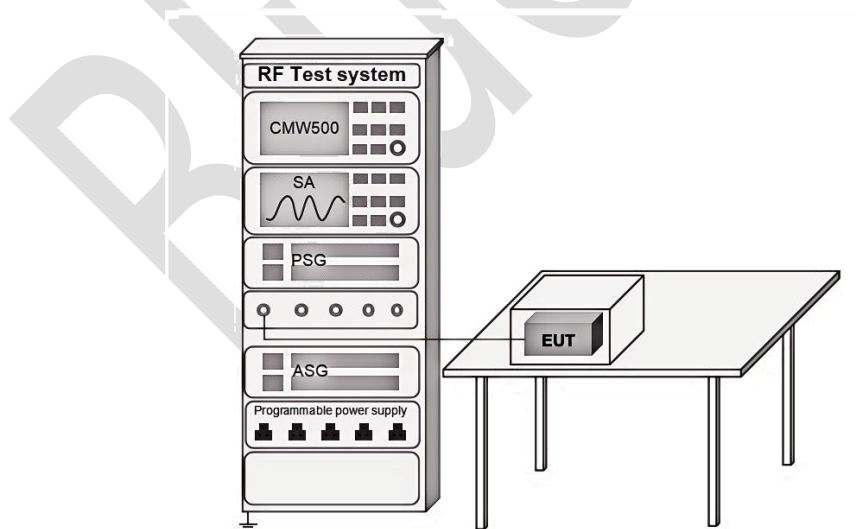
6.4 Transmitter unwanted emissions in the out-of-band domain

Test Standard	ETSI EN 300328 V2.2.2 (2019-07)
Test Method	EN 300 328 V2.2.2 clause 5.4.8.2.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.4.1 Limit



6.4.2 Test setup



6.4.3 Test data

Pass: Please refer to appendix A for details.

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Version:v1.2

6.5 Transmitter unwanted emissions in the spurious domain

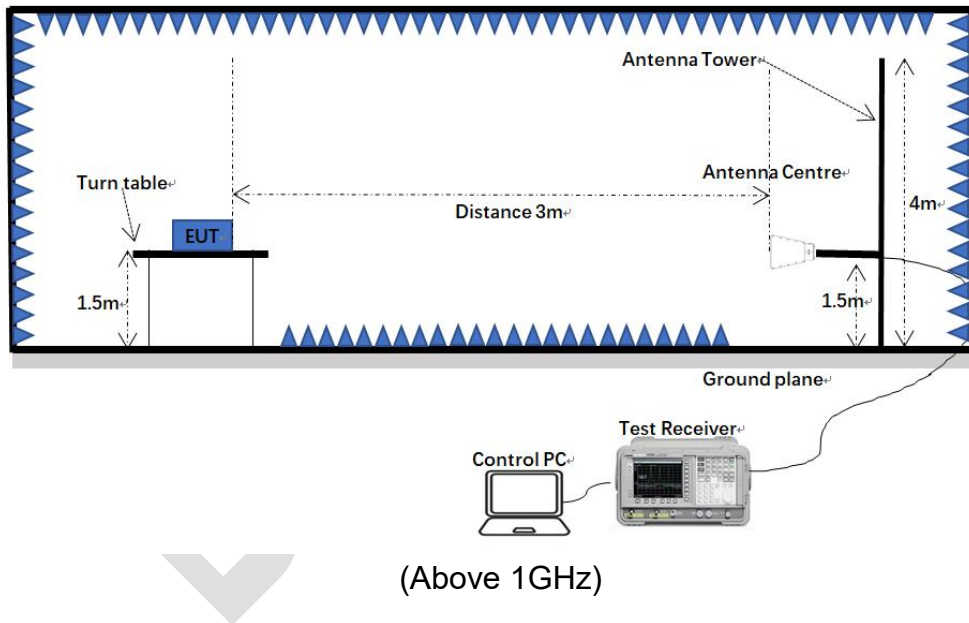
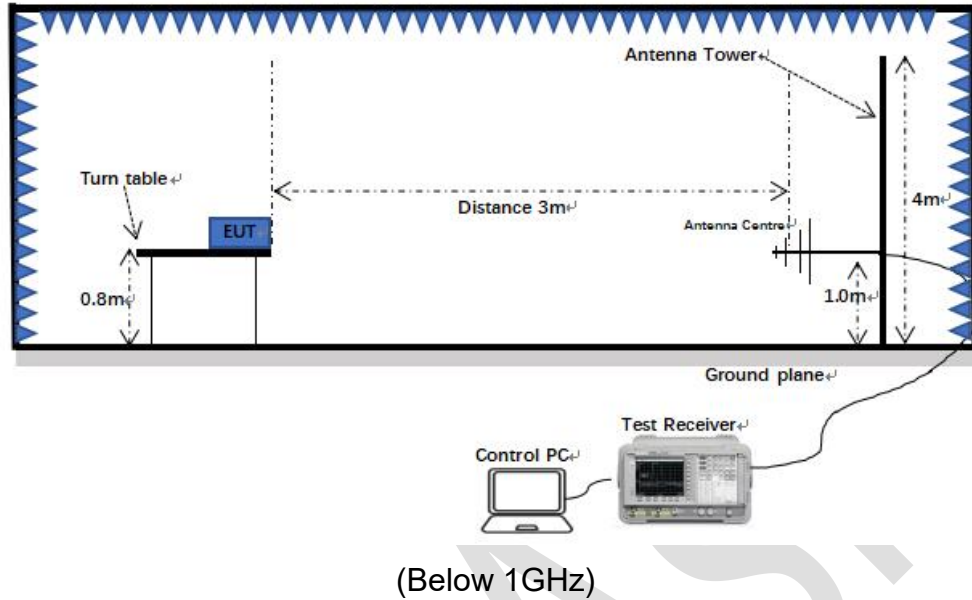
Test Standard	ETSI EN 300328 V2.2.2 (2019-07)
Test Method	EN 300 328 V2.2.2 clause 5.4.9.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.5.1 Limit

Table 1: Transmitter limits for spurious emissions

Frequency range	Maximum power e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87,5 MHz	-36dBm	100 kHz
87,5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 694 MHz	-54dBm	100 kHz
694 MHz to 1 GHz	-36dBm	100 kHz
1 GHz to 12,75 GHz	-30dBm	1MHz

6.5.1 Test setup



6.5.2 Test procedure

1. Scan from 30MHz to 12.75GHz; find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.
3. Final Level = Receiver Read level + Correct factor
4. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Below 1GHz test procedure as below:

- 1) The EUT was powered on and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length. Modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) Rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6) The output power into the substitution antenna was then measured.
- 7) Steps 5) and 6) were repeated with both antennas vertically polarized.

Above 1GHz test procedure as below:

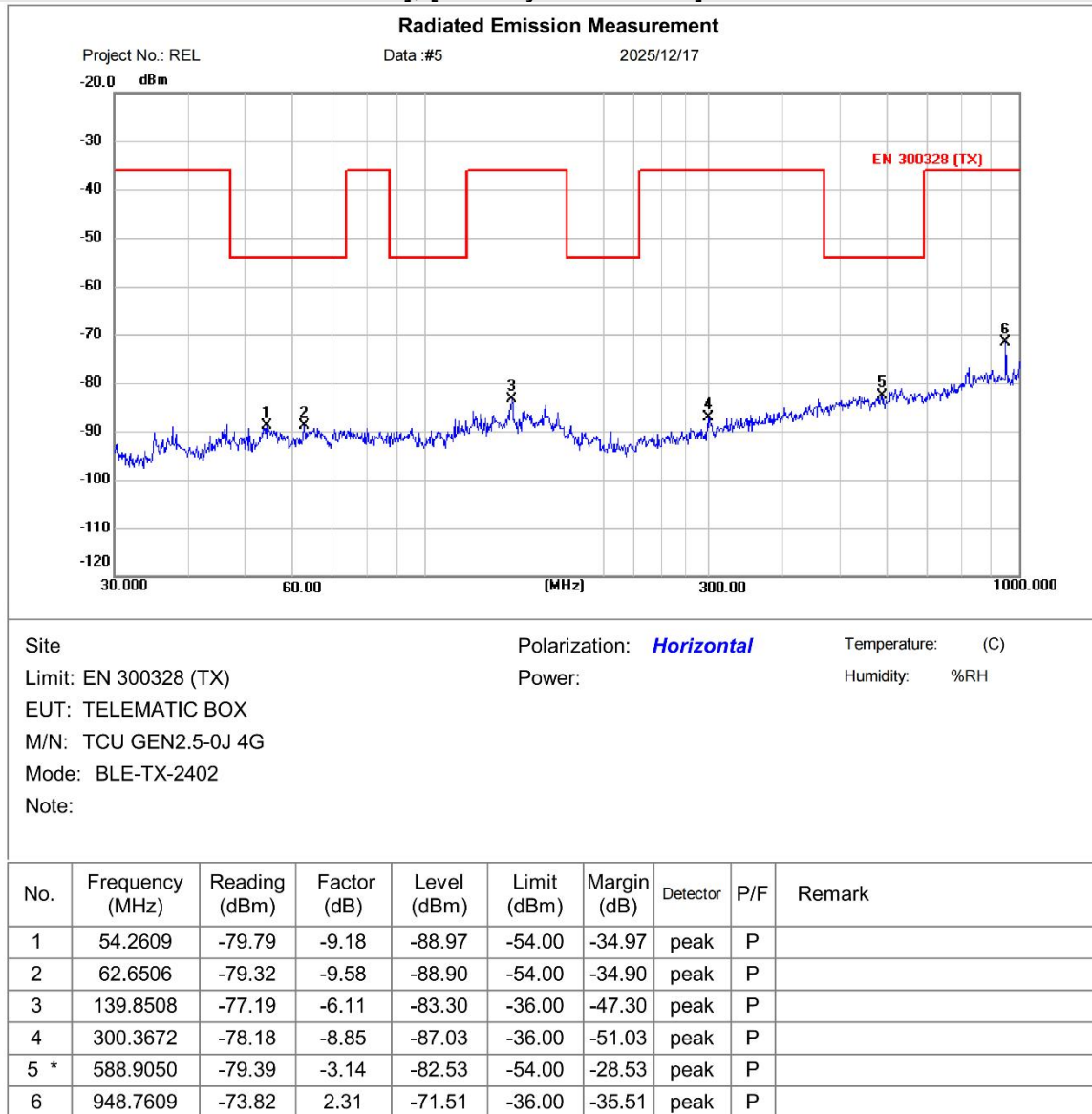
- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber.

6.5.3 Test data

Note: The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported, all modes have been tested, and only the worst mode is showed in the report. During the test, pre-scan the BLE1M, BLE2M modulation, and found the BLE1M modulation which it is worse case.

6.5.3.1 Below 1GHz

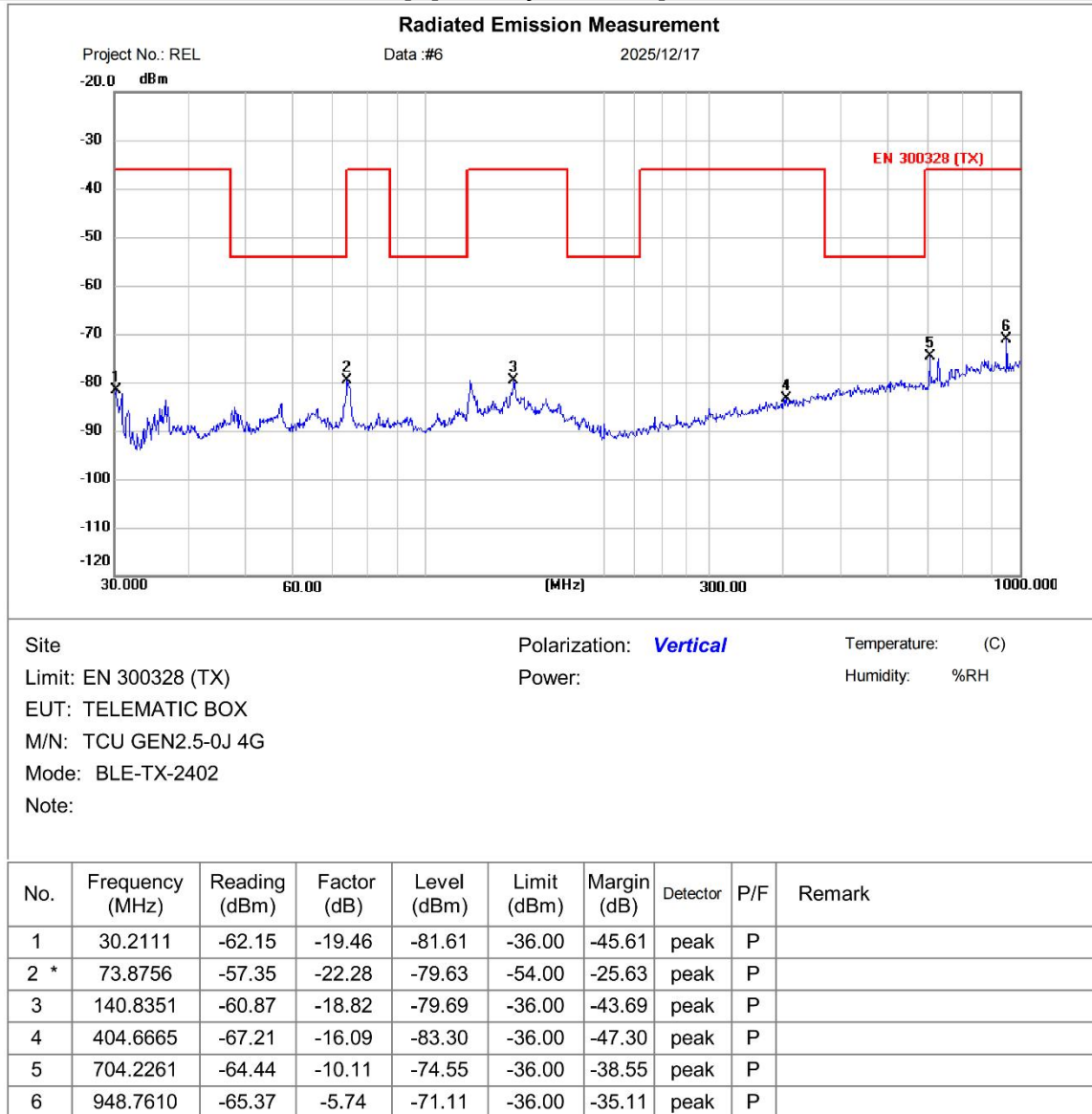
[Test Mode: TX low channel-2402MHz]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

Test Result: Pass

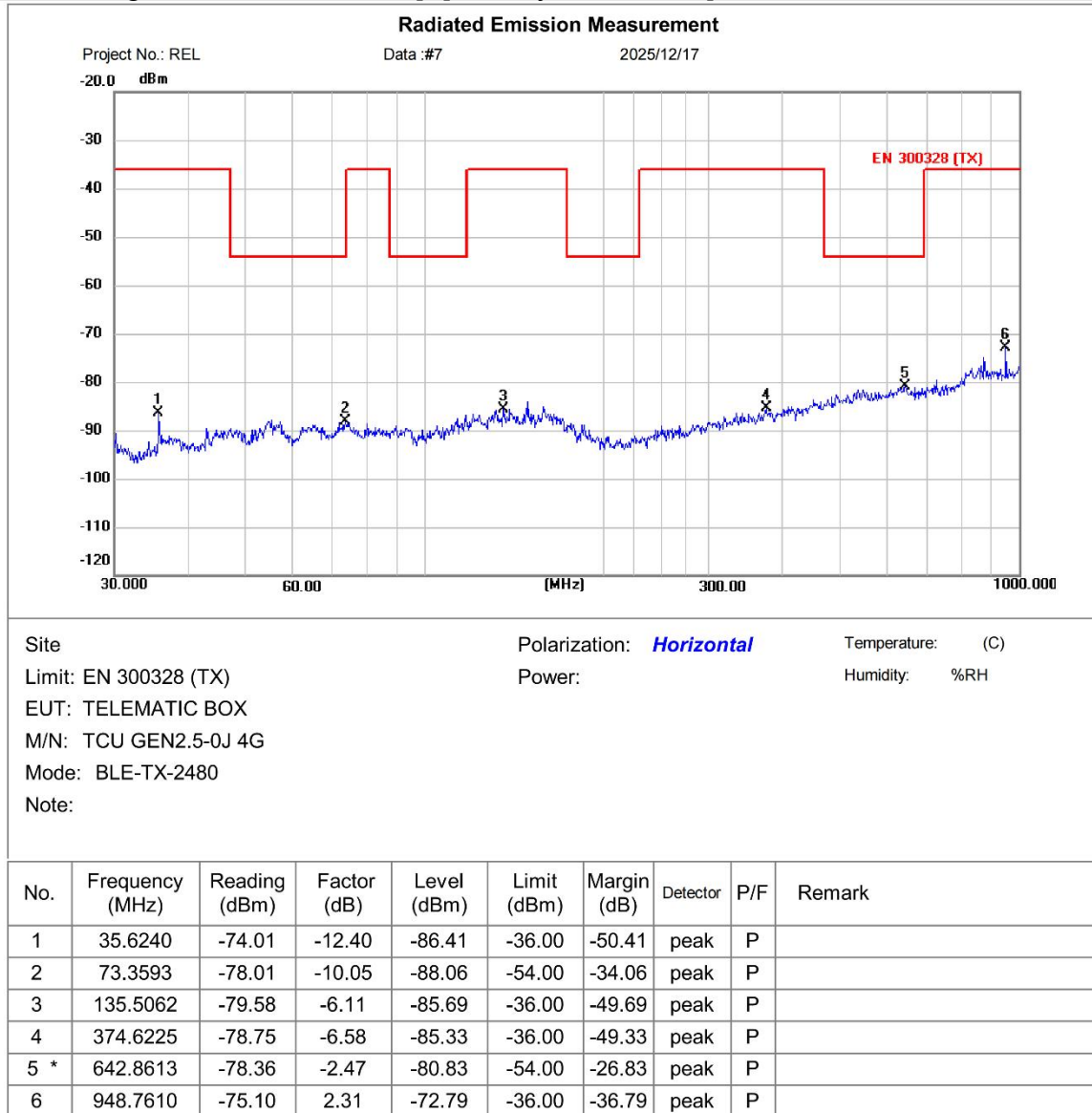
[Test Mode: TX low channel-2402MHz]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

Test Result: Pass

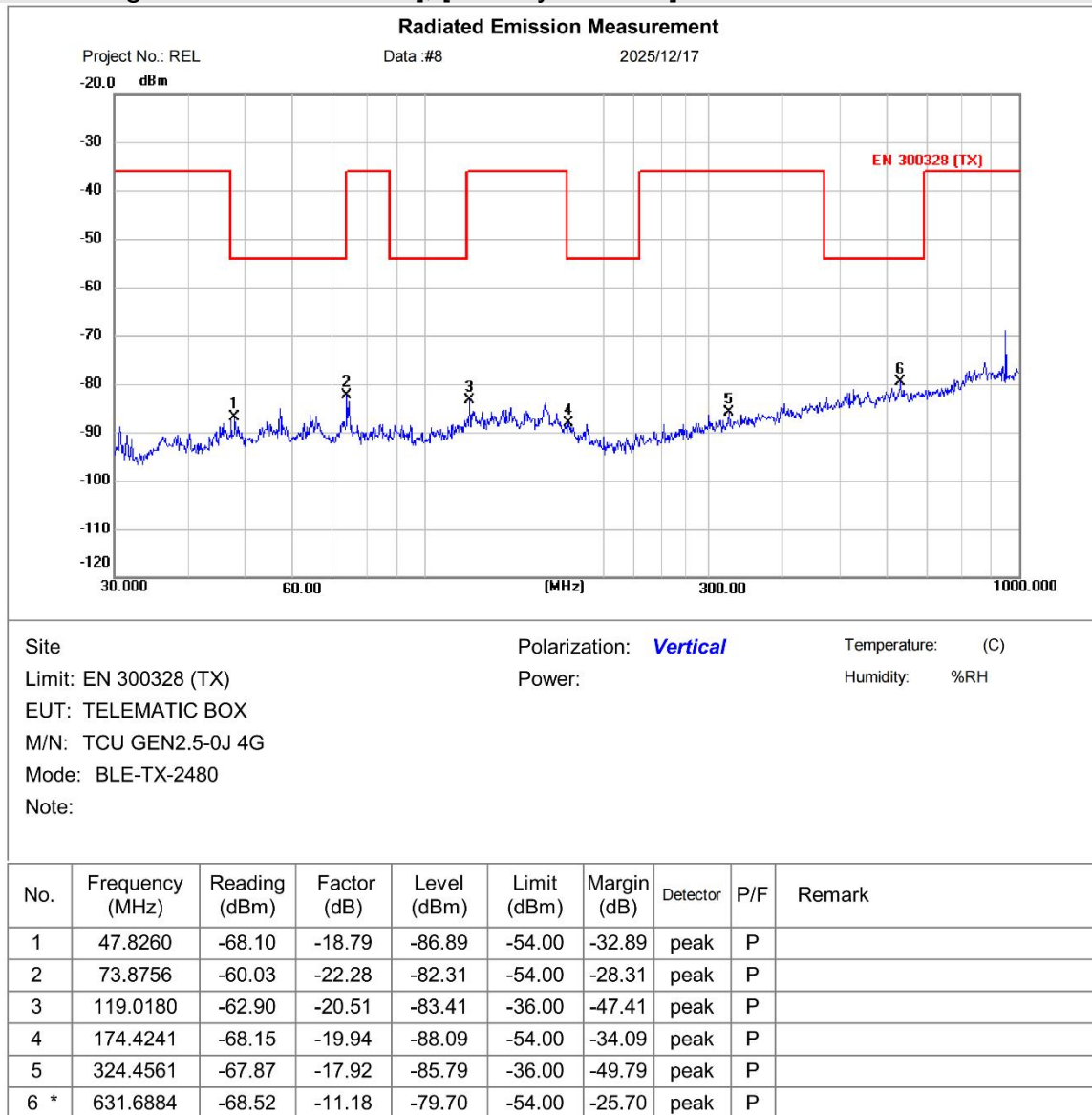
[Test Mode: TX high channel-2480MHz]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

Test Result: Pass

[Test Mode: TX high channel-2480MHz]; [Polarity: Vertical]

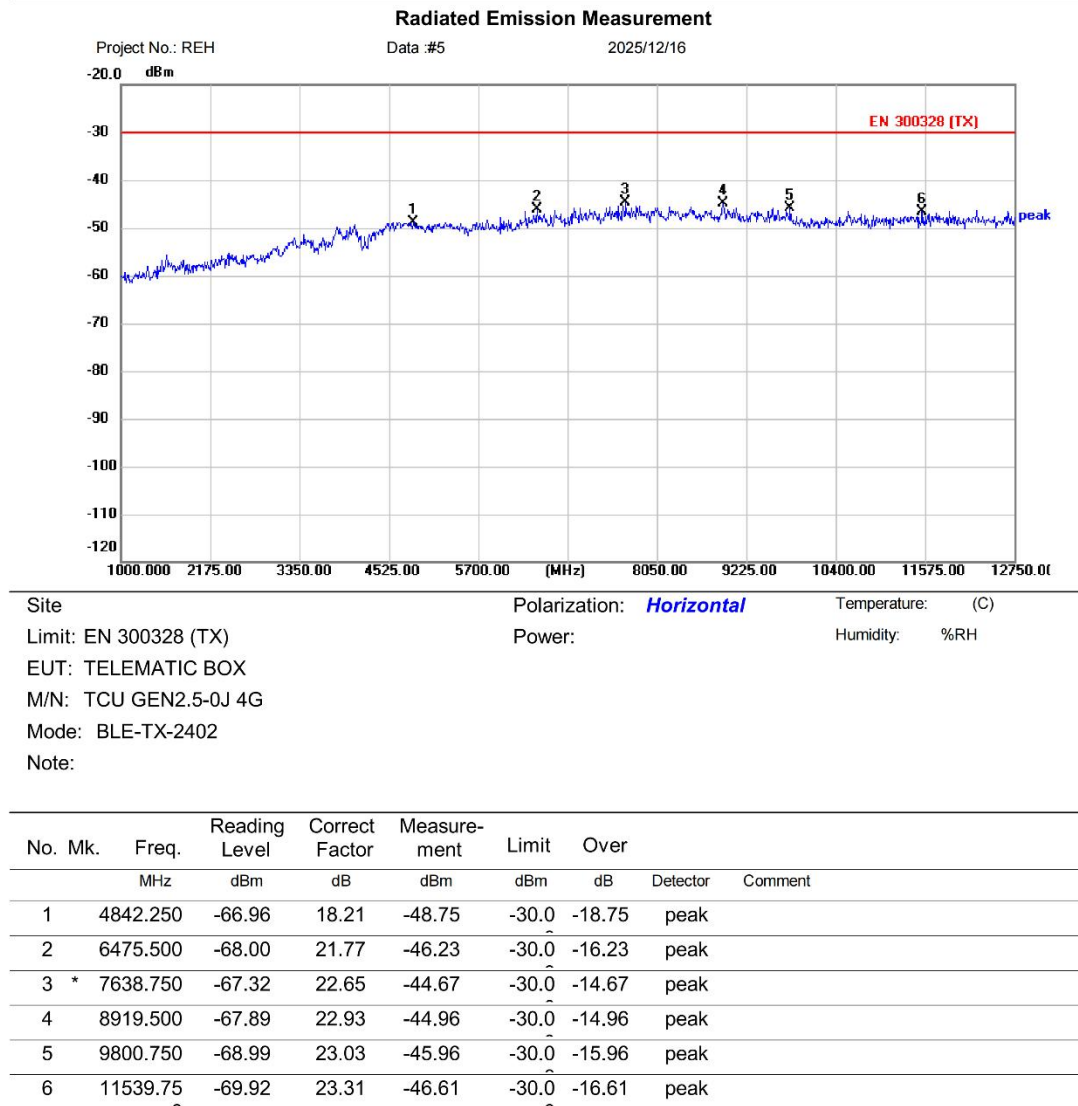


*:Maximum data x:Over limit !:over margin

Test Result: Pass

6.5.3.2 Above 1GHz

[Test Mode: TX Low channel-2402MHz]; [Polarity: Horizontal]



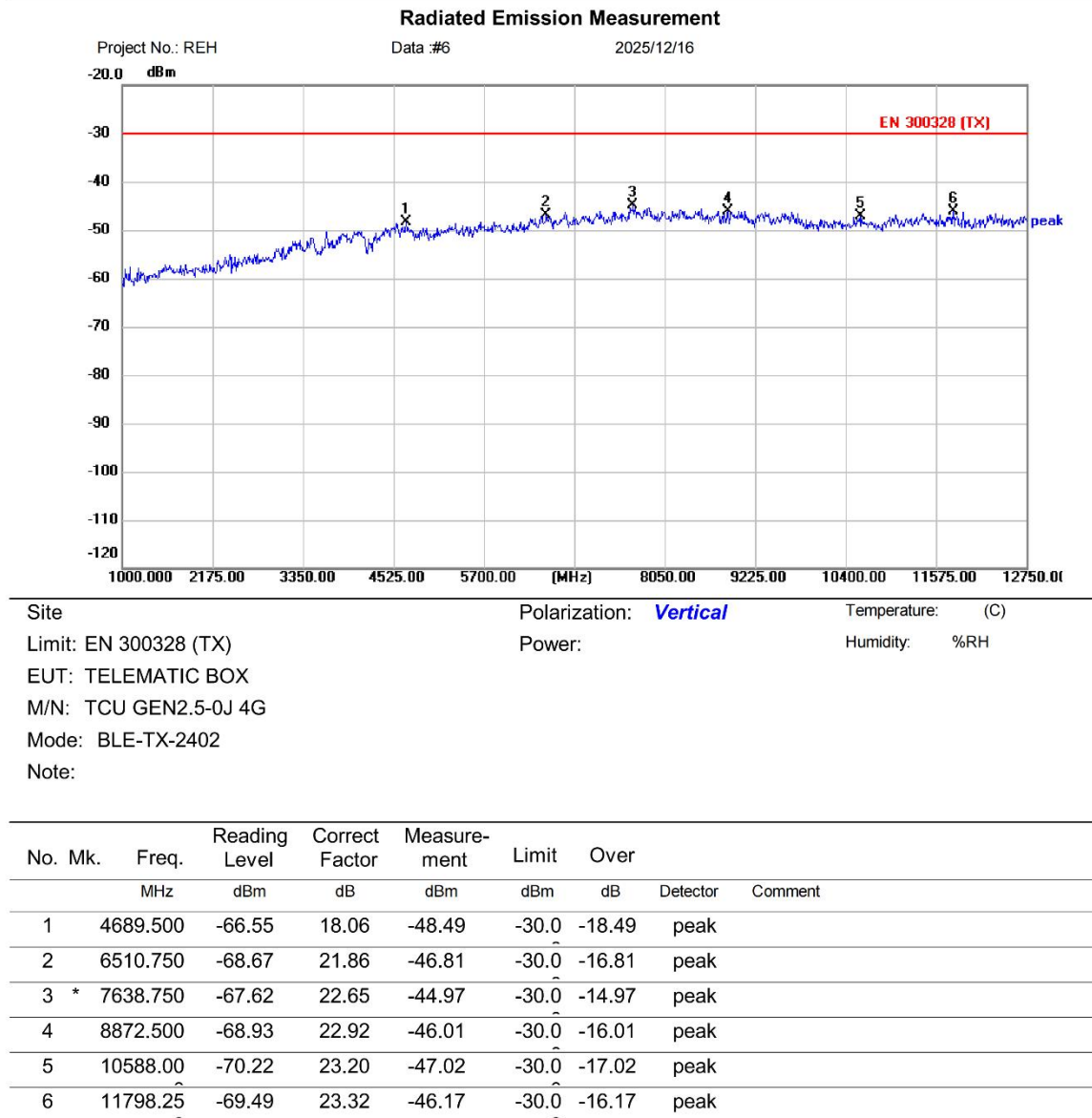
*:Maximum data x:Over limit !:over margin
Receiver: ESR_1
Antenna:

Spectrum Analyzer: FSP40
Engineer Signature:

⟨Reference Only⟩

Test Result: Pass

[Test Mode: TX Low channel-2402MHz]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Receiver: ESR_1

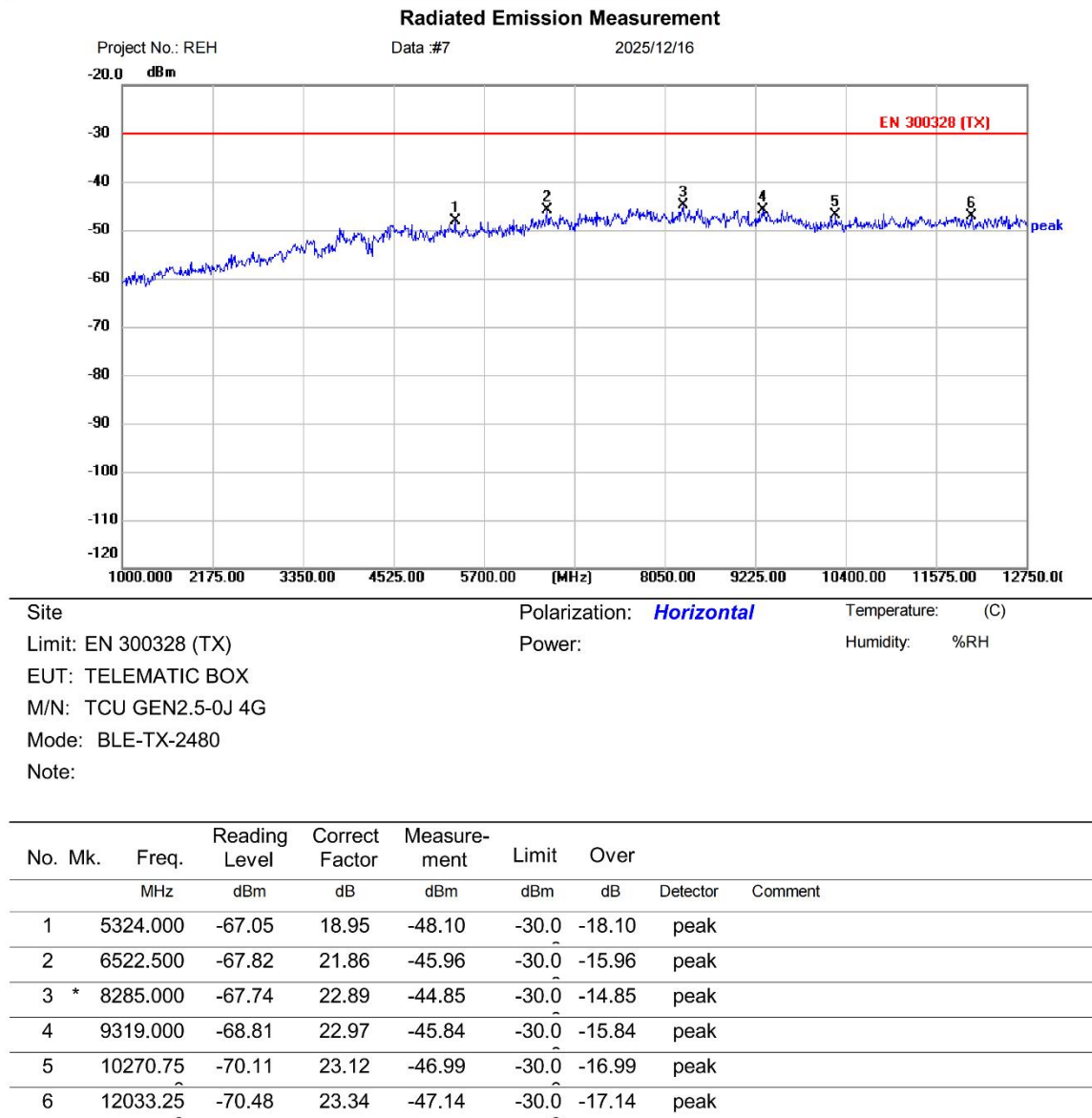
Spectrum Analyzer: FSP40

Antenna:

Frequency Standard:

Test Result: Pass

[Test Mode: TX high channel-2480MHz]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Receiver: ESR_1

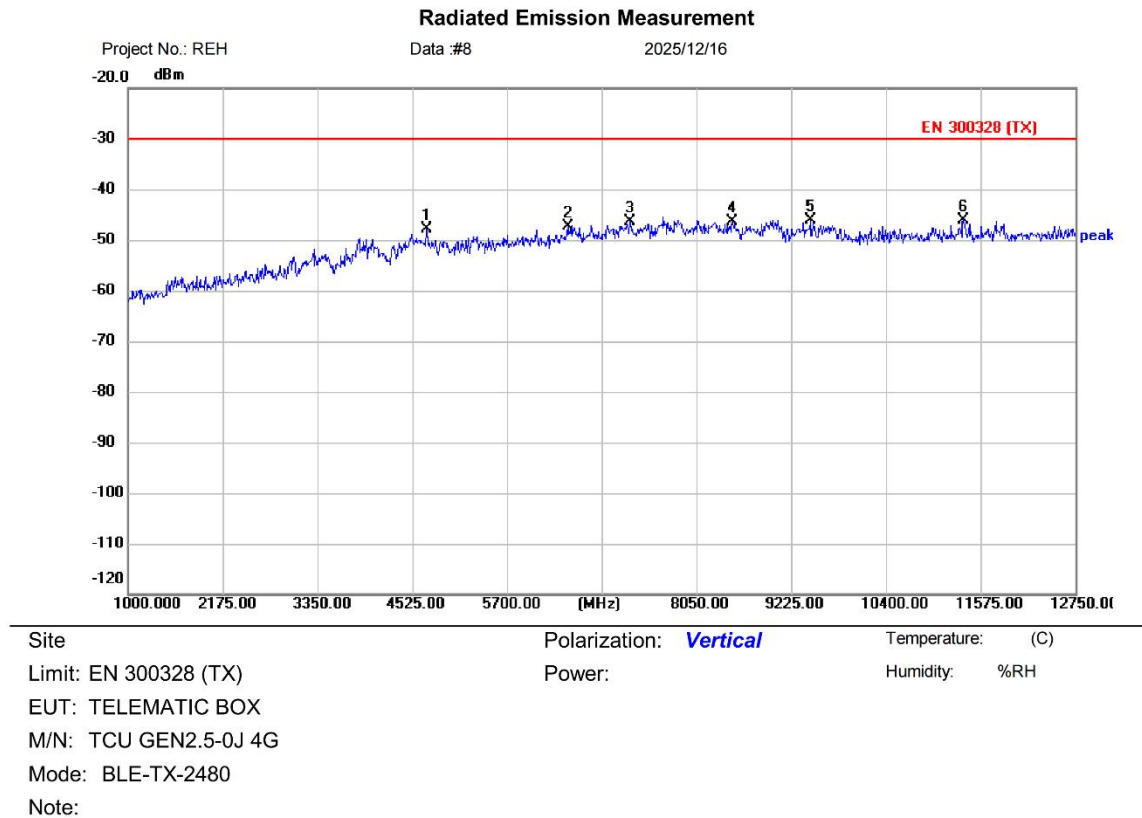
Spectrum Analyzer: FSP40

Antenna:

Emitted Signal:

Test Result: Pass

[Test Mode: TX high channel-2480MHz]; [Polarity: Vertical]



No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
	MHz	dBm	dB	dBm	dBm	dB		
1	4701.250	-65.87	18.07	-47.80	-30.0	-17.80	peak	
2	6452.000	-69.18	21.69	-47.49	-30.0	-17.49	peak	
3	7227.500	-68.54	22.16	-46.38	-30.0	-16.38	peak	
4	8496.500	-69.22	22.90	-46.32	-30.0	-16.32	peak	
5	9460.000	-69.16	22.99	-46.17	-30.0	-16.17	peak	
6 *	11363.50	-69.37	23.30	-46.07	-30.0	-16.07	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Receiver: ESR_1

Spectrum Analyzer: FSP40

Antenna:

Engineer:Guan

Test Result: Pass

6.6 Receiver spurious emissions

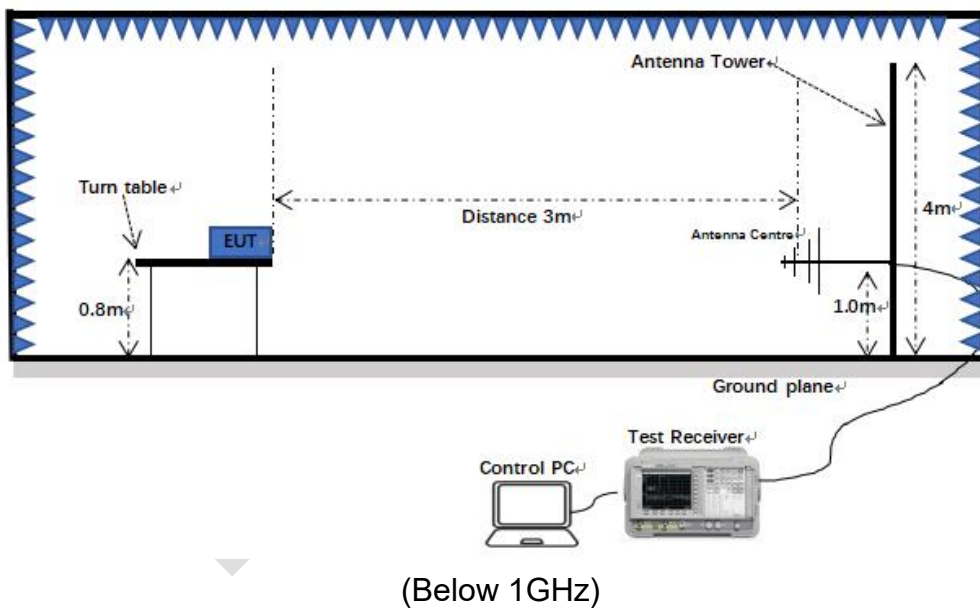
Test Standard	ETSI EN 300328 V2.2.2 (2019-07)
Test Method	EN 300 328 V2.2.2 clause 5.4.10.2
Test Mode (Pre-Scan)	RX
Test Mode (Final Test)	RX

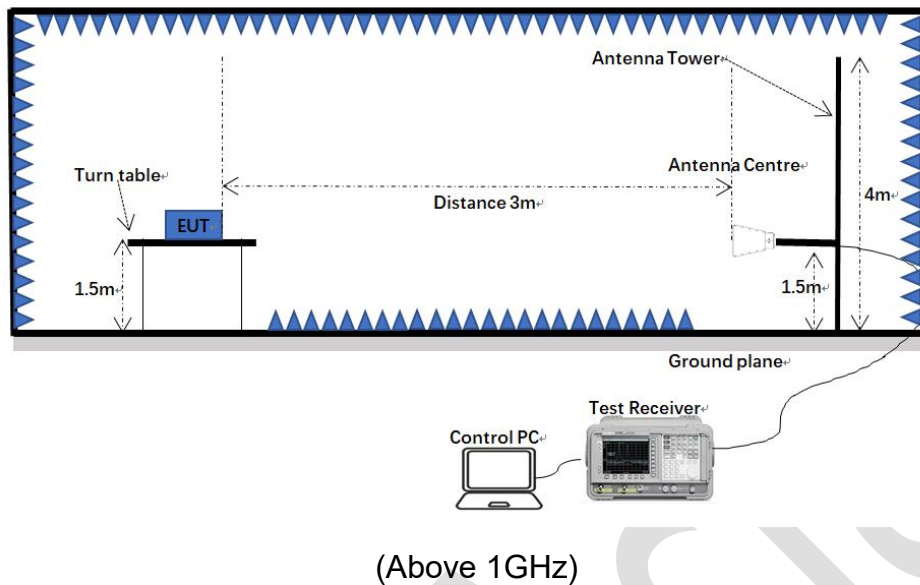
6.6.1 Limit

The spurious emissions of the receiver shall not exceed the values in tables in the indicated bands:

Frequency Range	Limit
30 MHz to 1 GHz	2nW(-57dBm)
Above 1GHz	20nW(-47dBm)

6.6.2 Test setup





6.6.3 Test procedure

1. Scan from 30MHz to 12.75GHz; find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.
3. Final Level = Receiver Read level + Correct factor
4. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Below 1GHz test procedure as below:

- 1) The EUT was powered on and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length. Receiver mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) Rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6) The output power into the substitution antenna was then measured.
- 7) Steps 5) and 6) were repeated with both antennas vertically polarized.

Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber.

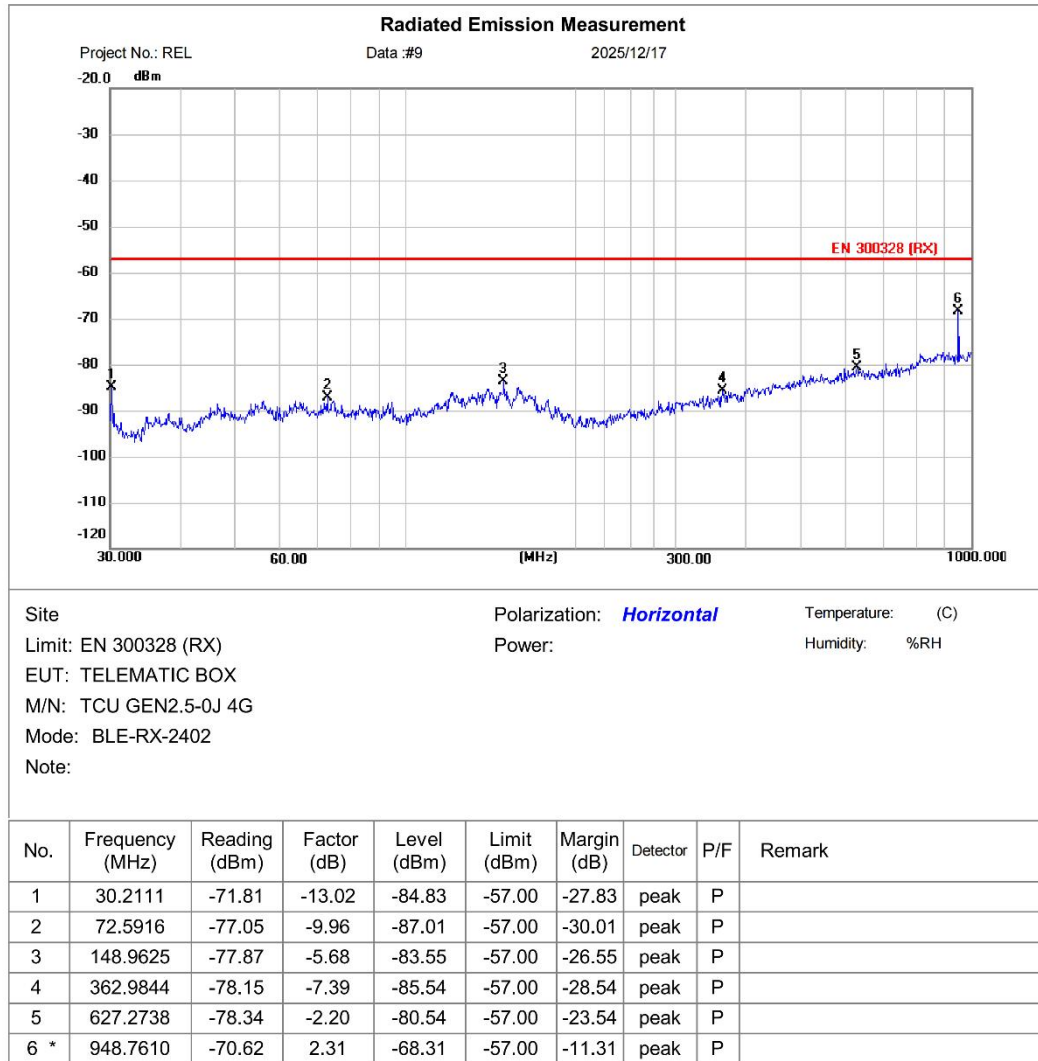
6.6.4 Test data

Note: The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported, all modes have been tested, and only the worst mode is showed in the report. During the test, pre-scan the BLE1M, BLE2M modulation, and found the BLE1M modulation which it is worse case.

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6.6.4.1 Below 1GHz

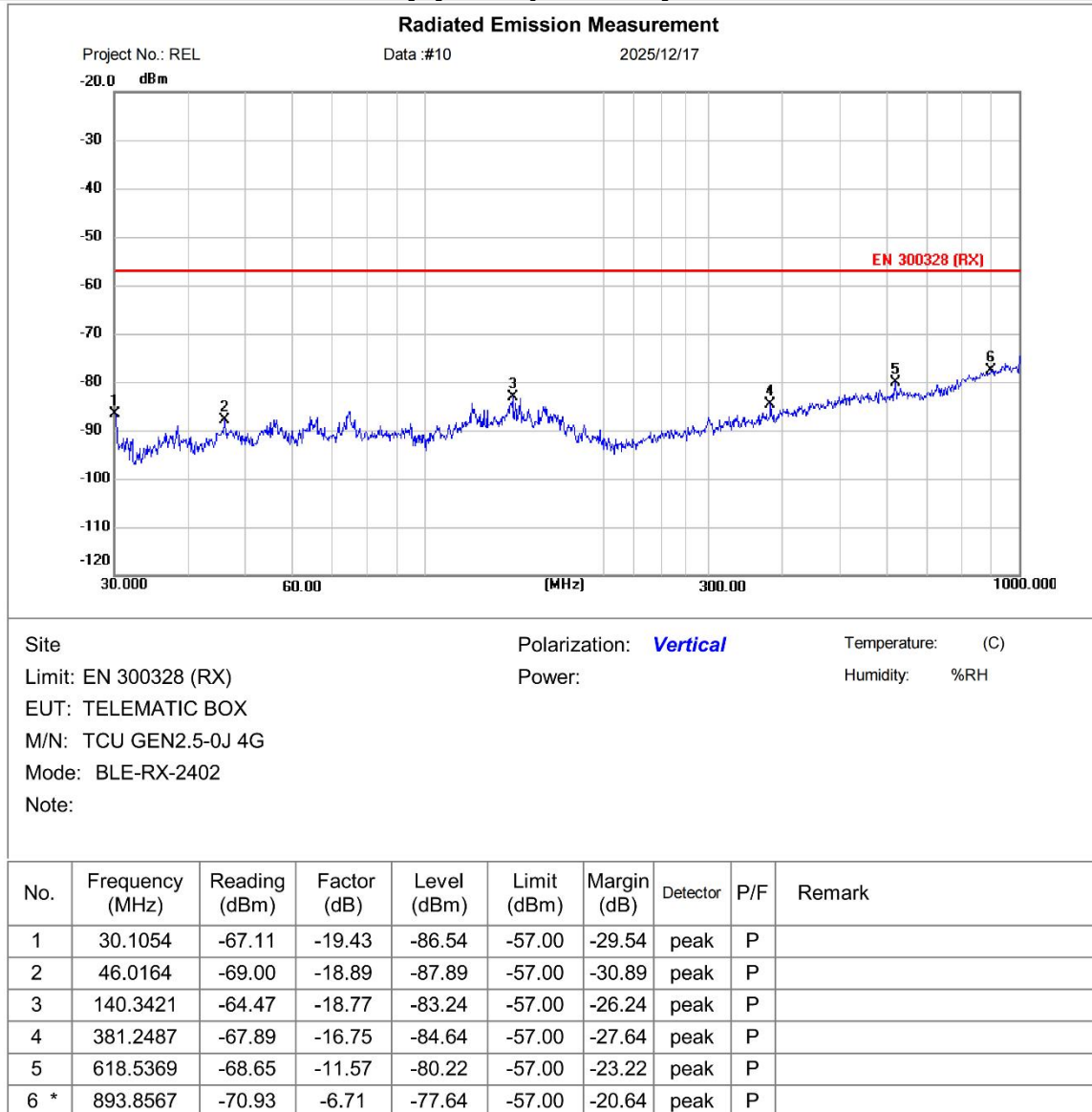
[Test Mode: RX low channel-2402MHz]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

Test Result: Pass

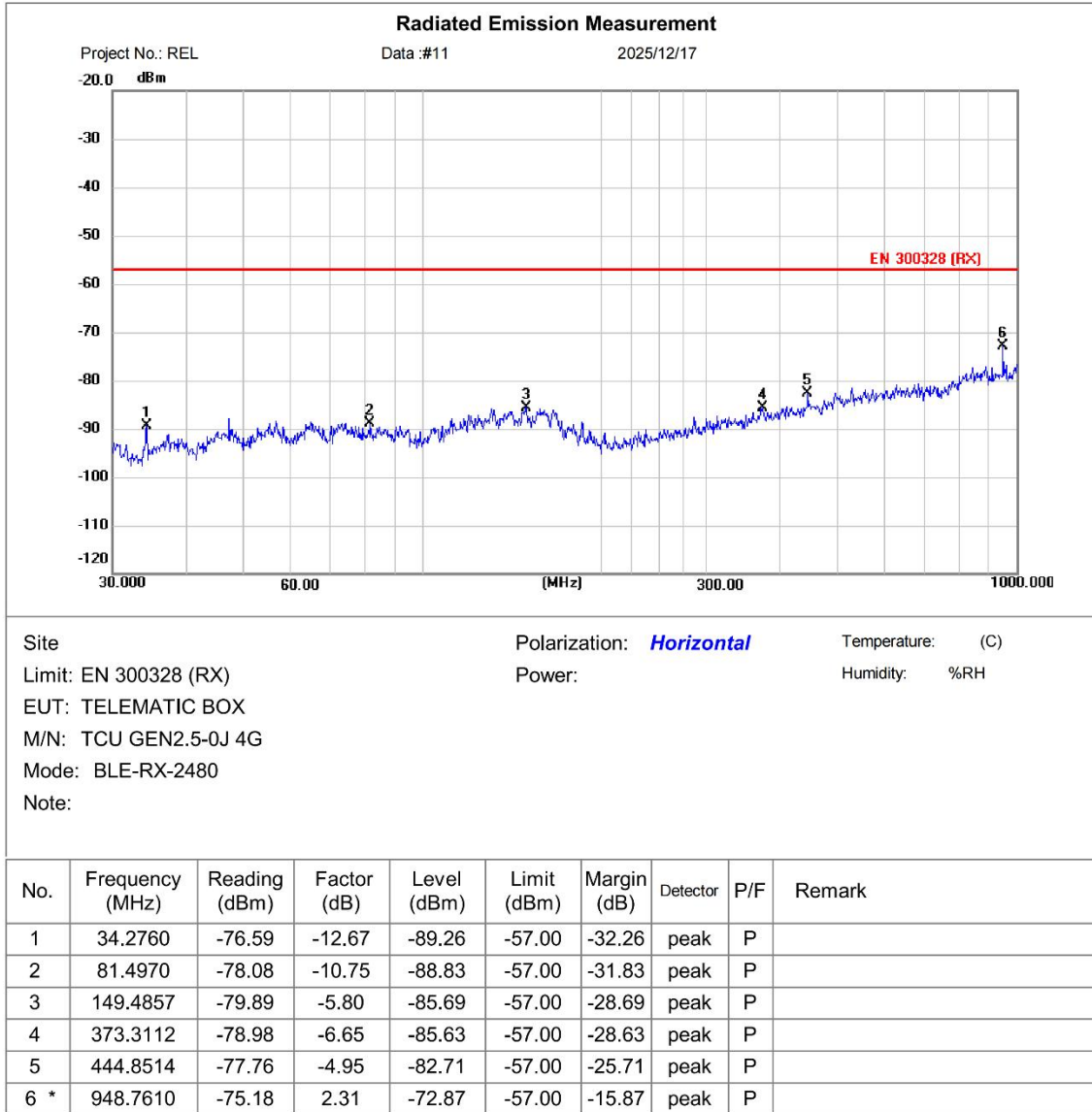
[Test Mode: RX low channel-2402MHz]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

Test Result: Pass

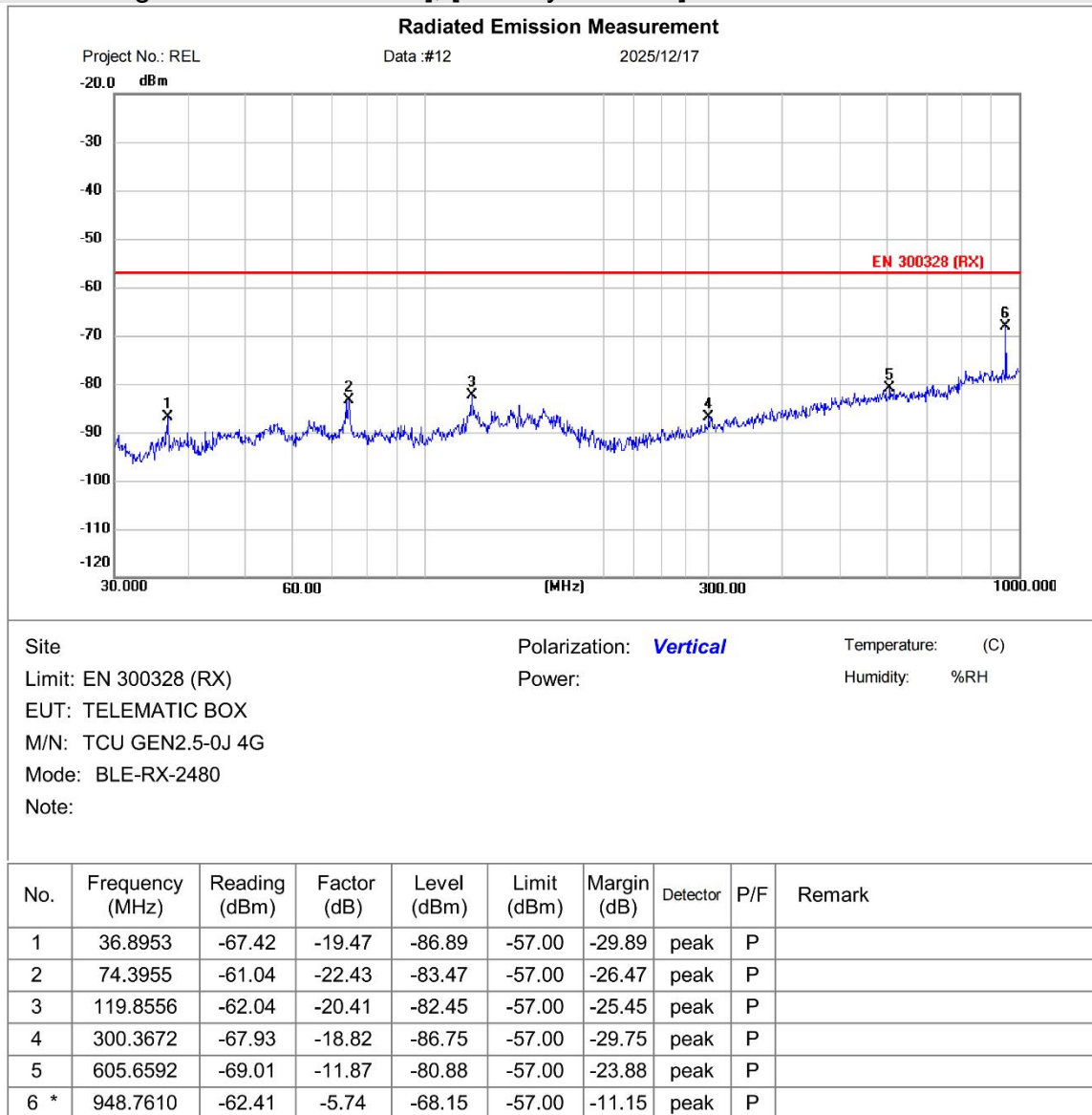
[Test Mode: RX high channel-2480MHz]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

Test Result: Pass

[Test Mode: RX High channel-2480MHz]; [Polarity: Vertical]



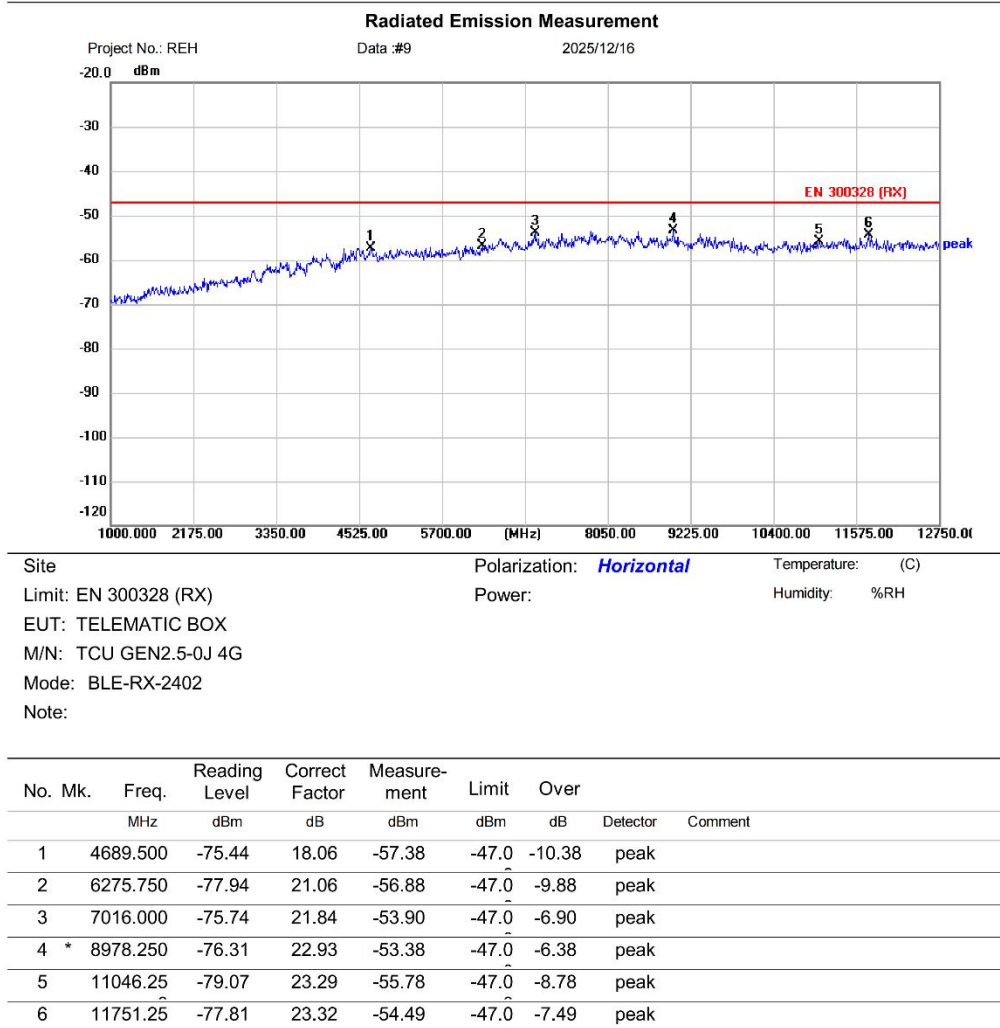
*:Maximum data x:Over limit !:over margin

Test Result: Pass

6.6.4.2 Above 1GHz

Note: The disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. During the test, pre-scan the BLE1M/BLE2M, and found the BLE1M mode which it is worse case.

[Test Mode: RX Low channel-2402MHz]; [Polarity: Horizontal]



!:Maximum data x:Over limit !:over margin

Receiver: ESR_1

Spectrum Analyzer: FSP40

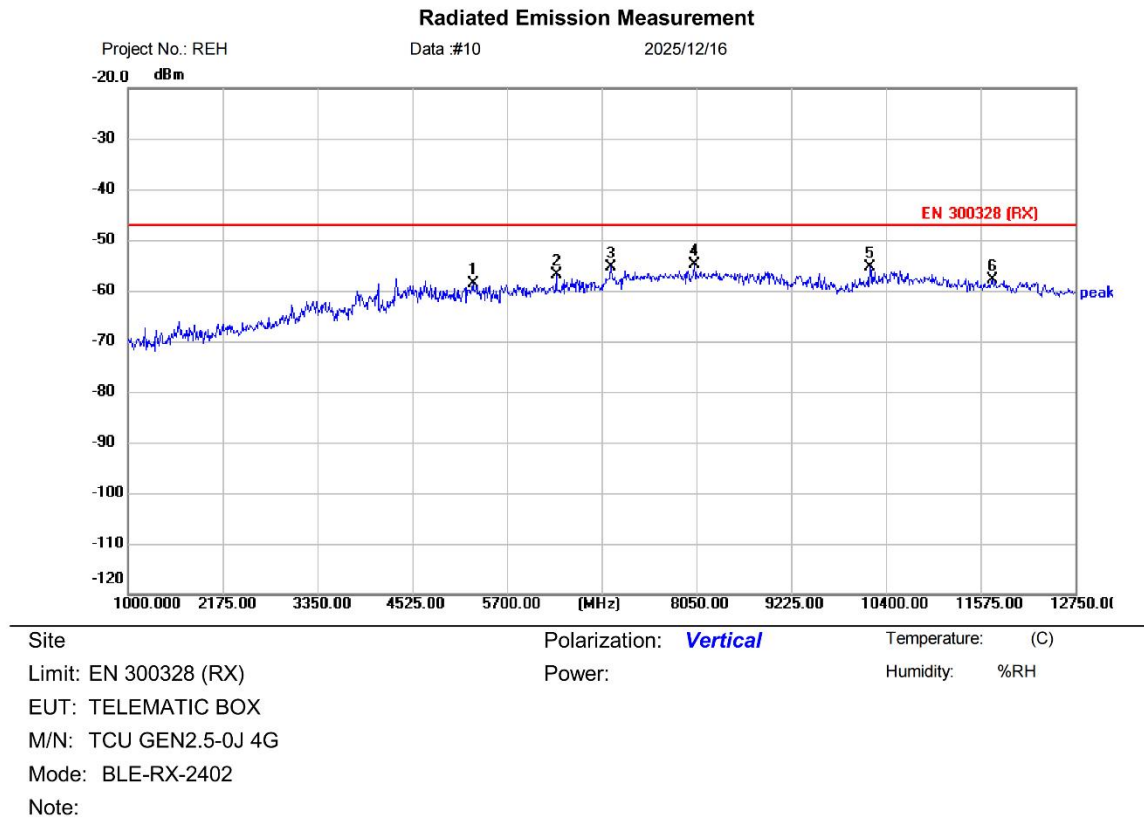
(Reference Only)

Antenna:

Engineer Signature:

Test Result: Pass

[Test Mode: RX Low channel-2402MHz]; [Polarity: Vertical]



No. Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Detector	Comment
1	5277.000	-77.57	18.87	-58.70	-47.0	-11.70	peak	
2	6311.000	-78.15	21.18	-56.97	-47.0	-9.97	peak	
3	6992.500	-77.10	21.82	-55.28	-47.0	-8.28	peak	
4 *	8026.500	-77.78	22.87	-54.91	-47.0	-7.91	peak	
5	10200.25	-78.39	23.11	-55.28	-47.0	-8.28	peak	
6	11716.00	-81.13	23.32	-57.81	-47.0	-10.81	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Receiver: ESR_1

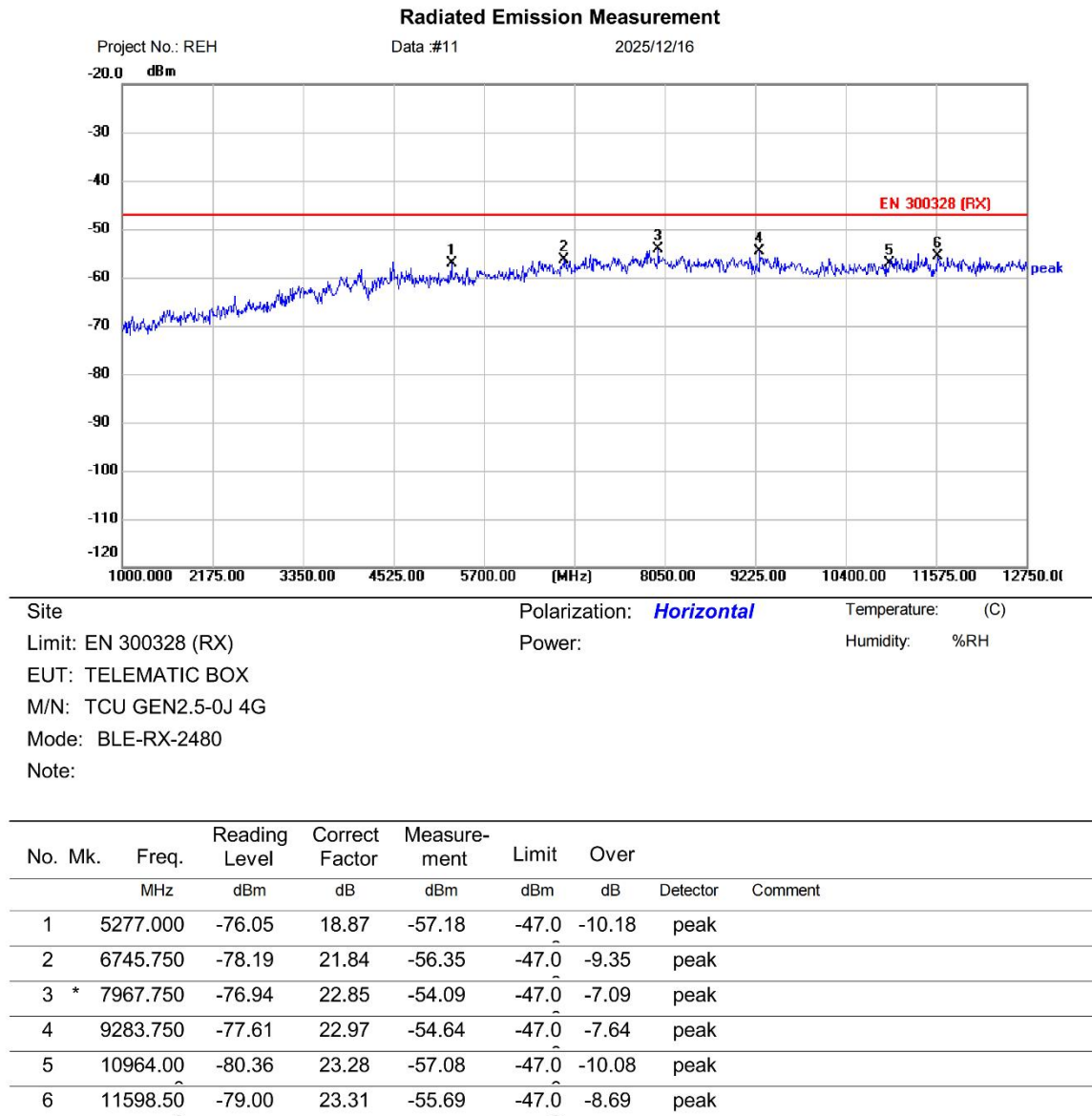
Spectrum Analyzer: FSP40

Antenna:

Emitted Signal:

Test Result: Pass

[Test Mode: RX high channel-2480MHz]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Receiver: ESR_1

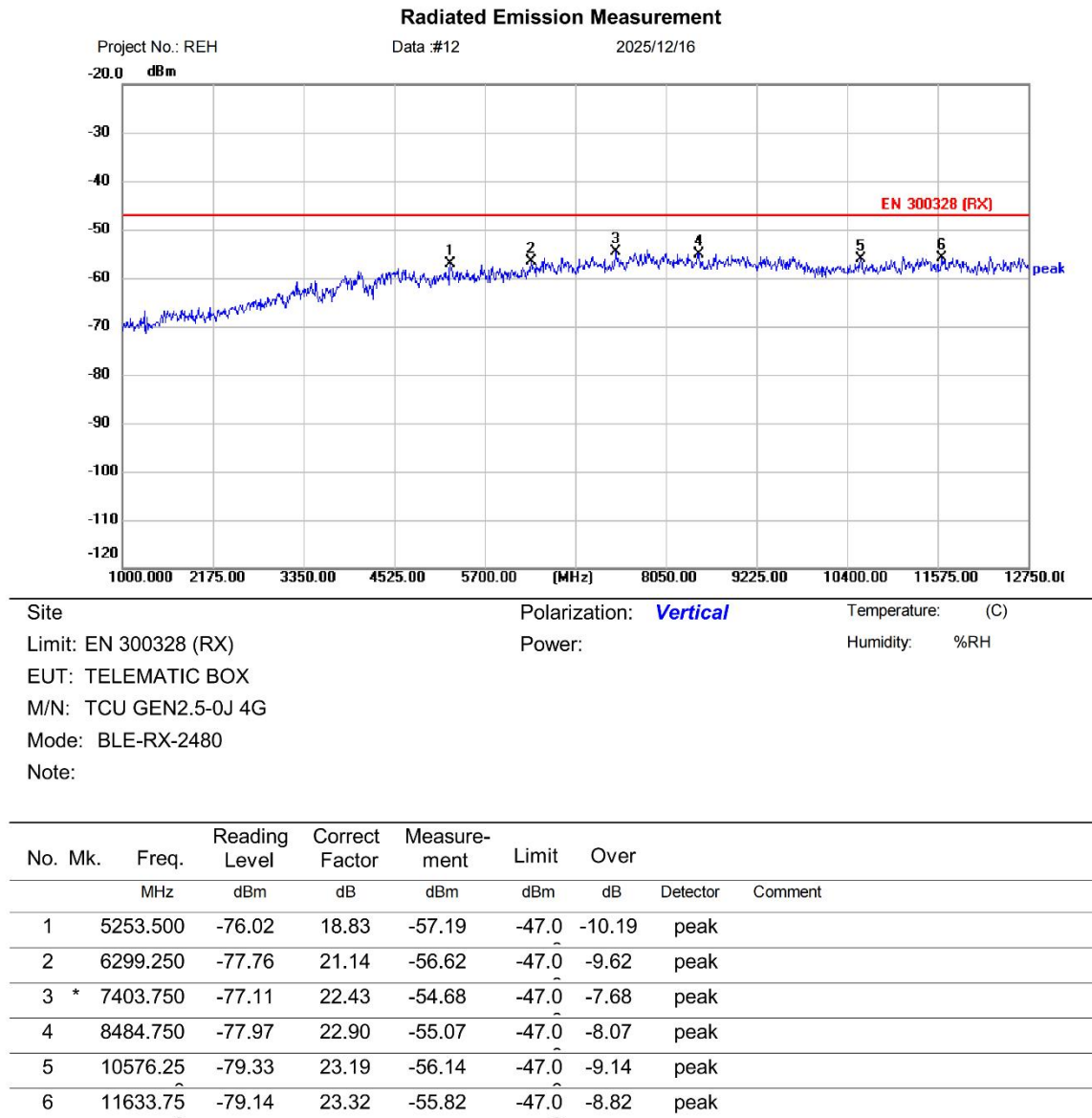
Spectrum Analyzer: FSP40

Antenna:

Emitted Structure:

Test Result: Pass

[Test Mode: RX high channel-2480MHz]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Receiver: ESR_1

Spectrum Analyzer: FSP40

Antenna:

Engineer:Gao

Test Result: Pass

6.7 Receiver Blocking

Test Standard	ETSI EN 300328 V2.2.2 (2019-07)
Test Method	EN 300 328 V2.2.2 clause 5.4.11.2
Test Mode (Pre-Scan)	RX
Test Mode (Final Test)	RX

6.7.1 Limit

While maintaining the minimum performance criteria as defined in clause 4.3.1.12.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 6, table 7 or table 8.

Table 6: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal		
(-133 dBm + 10 × log ₁₀ (OCBW)) or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW		
(-139 dBm + 10 × log ₁₀ (OCBW)) or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674				
NOTE 1: OCBW is in Hz.					
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P _{min} + 26 dB where P _{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.					
NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P _{min} + 20 dB where P _{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.					
NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.					

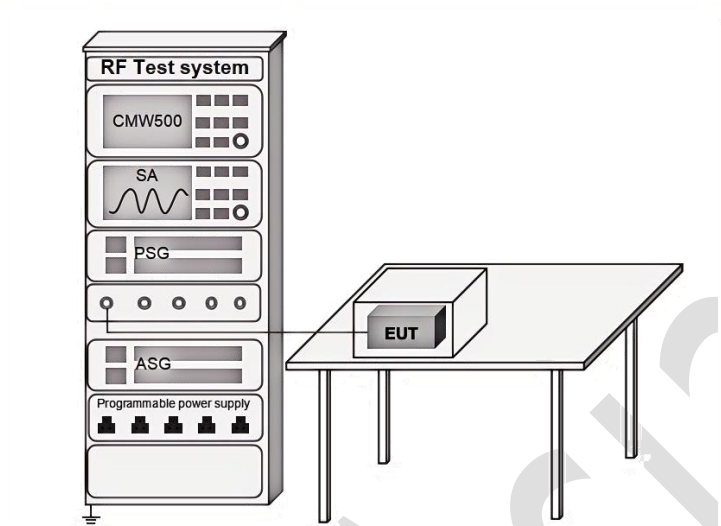
Table 7: Receiver Blocking parameters receiver Category 2 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB}$) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Table 8: Receiver Blocking parameters receiver Category 3 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB}$) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 30 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

6.7.2 Test setup



6.7.3 Test data

Pass: Please refer to appendix A for details.

7 Appendix A

7.1 Test data

7.1.1 RF Output Power

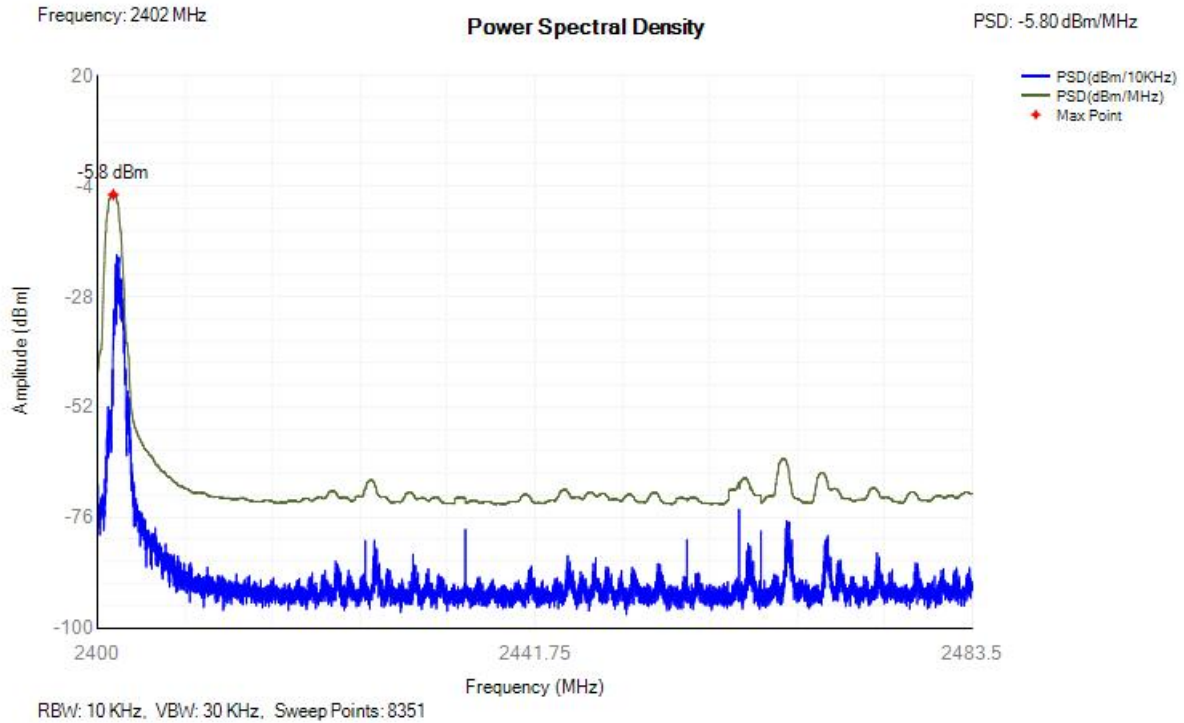
Condition	Mode	Frequency (MHz)	Antenna	Max Burst RMS Power (dBm)	Max EIRP (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-4.74	-2.44	20	Pass
NVNT	BLE 1M	2440	Ant1	-5.33	-3.03	20	Pass
NVNT	BLE 1M	2480	Ant1	-4.32	-2.02	20	Pass
NVNT	BLE 2M	2402	Ant1	-4.67	-2.37	20	Pass
NVNT	BLE 2M	2442	Ant1	-5.39	-3.09	20	Pass
NVNT	BLE 2M	2480	Ant1	-4.36	-2.06	20	Pass
NVLT	BLE 1M	2402	Ant1	-6.23	-3.93	20	Pass
NVLT	BLE 1M	2440	Ant1	-6.18	-3.88	20	Pass
NVLT	BLE 1M	2480	Ant1	-6.98	-4.68	20	Pass
NVLT	BLE 2M	2402	Ant1	-6.09	-3.79	20	Pass
NVLT	BLE 2M	2442	Ant1	-6.24	-3.94	20	Pass
NVLT	BLE 2M	2480	Ant1	-6.55	-4.25	20	Pass
NVHT	BLE 1M	2402	Ant1	-6.17	-3.87	20	Pass
NVHT	BLE 1M	2440	Ant1	-5.98	-3.68	20	Pass
NVHT	BLE 1M	2480	Ant1	-6.29	-3.99	20	Pass
NVHT	BLE 2M	2402	Ant1	-6.33	-4.03	20	Pass
NVHT	BLE 2M	2442	Ant1	-6.01	-3.71	20	Pass
NVHT	BLE 2M	2480	Ant1	-5.75	-3.45	20	Pass

Remark: NVNT: Normal Voltage Normal Temperature, NVLT: Normal Voltage low Temperature, NVHT: Normal Voltage High Temperature. Antenna Gain = 2.3dBi, which declared by applicant.

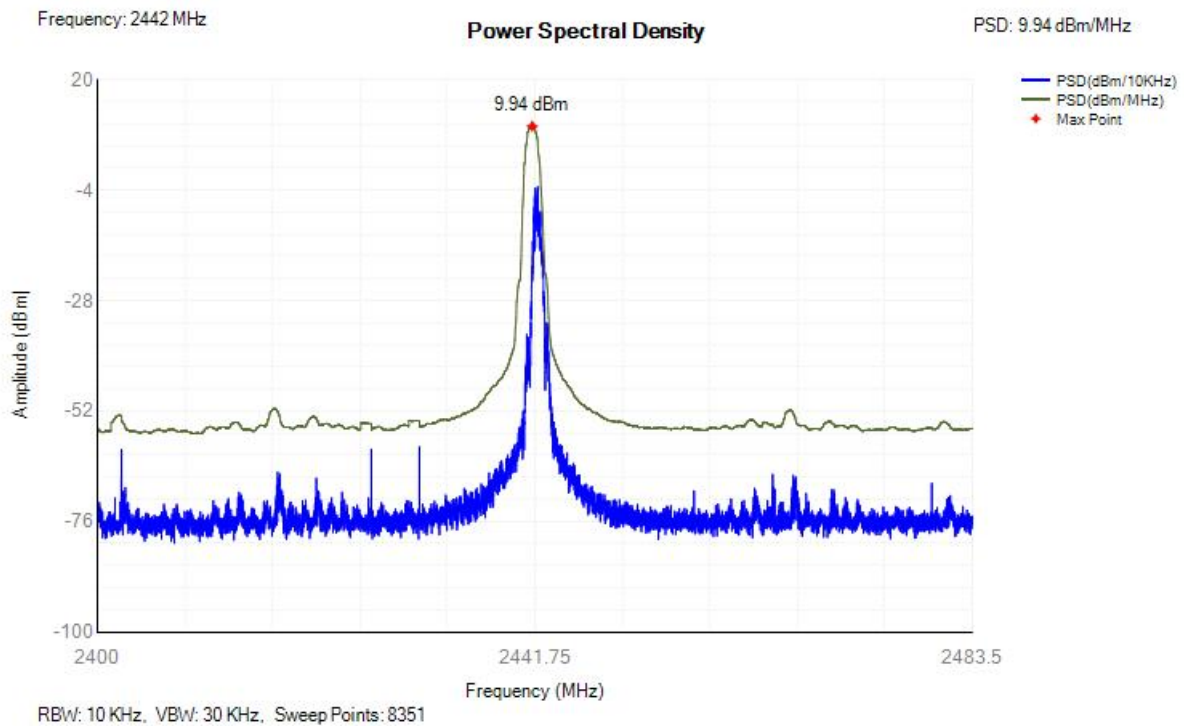
7.1.2 Power Spectral Density

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-5.8	10	Pass
NVNT	BLE 1M	2442	Ant1	9.94	10	Pass
NVNT	BLE 1M	2480	Ant1	-5.39	10	Pass
NVNT	BLE 2M	2402	Ant1	-6.51	10	Pass
NVNT	BLE 2M	2442	Ant1	-7.26	10	Pass
NVNT	BLE 2M	2480	Ant1	-6.23	10	Pass

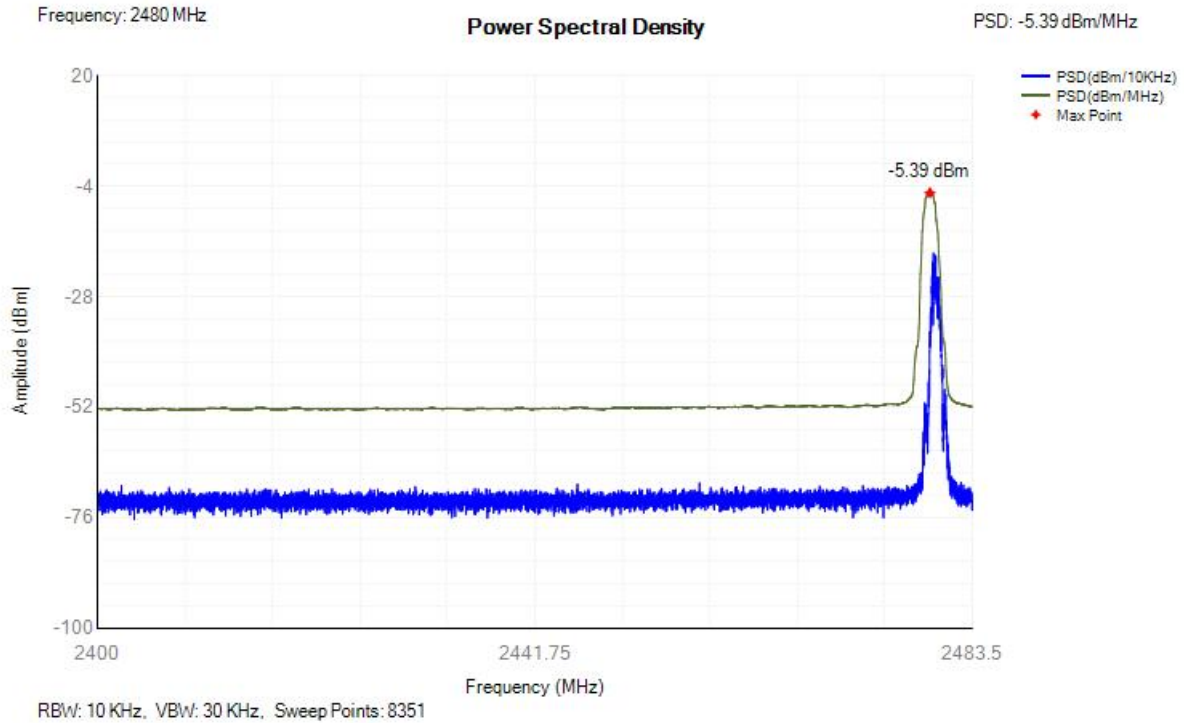
PSD NVNT BLE 1M 2402MHz Ant1



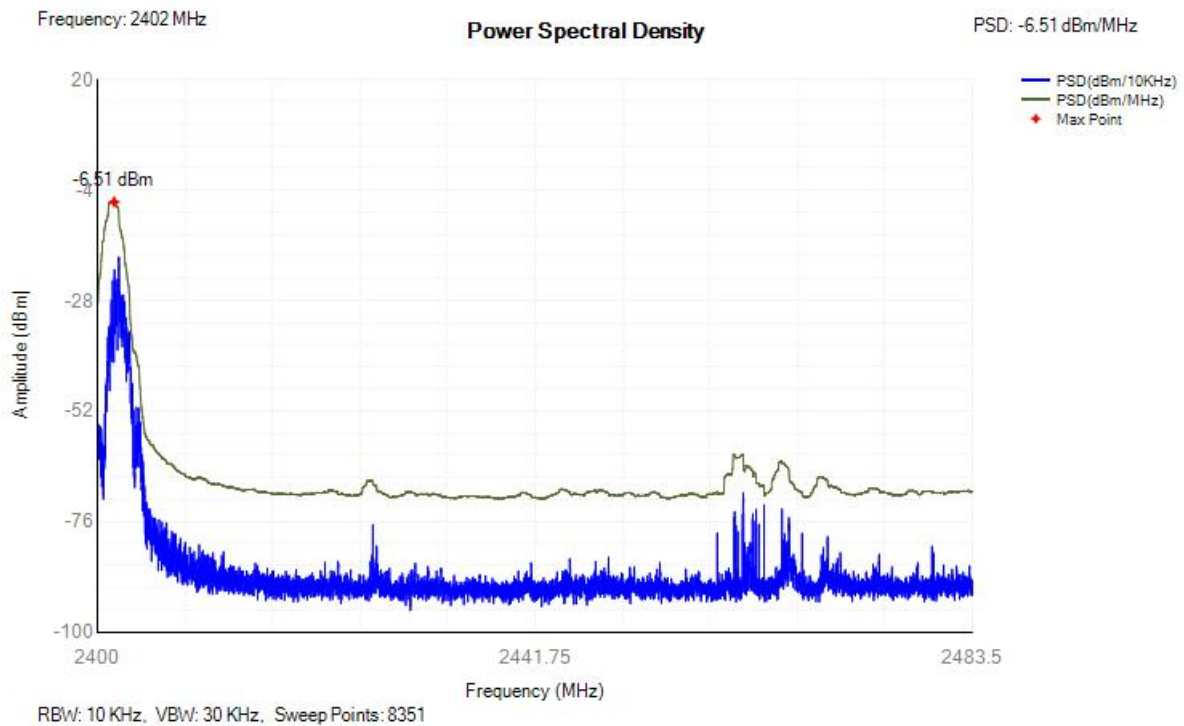
PSD NVNT BLE 1M 2442MHz Ant1



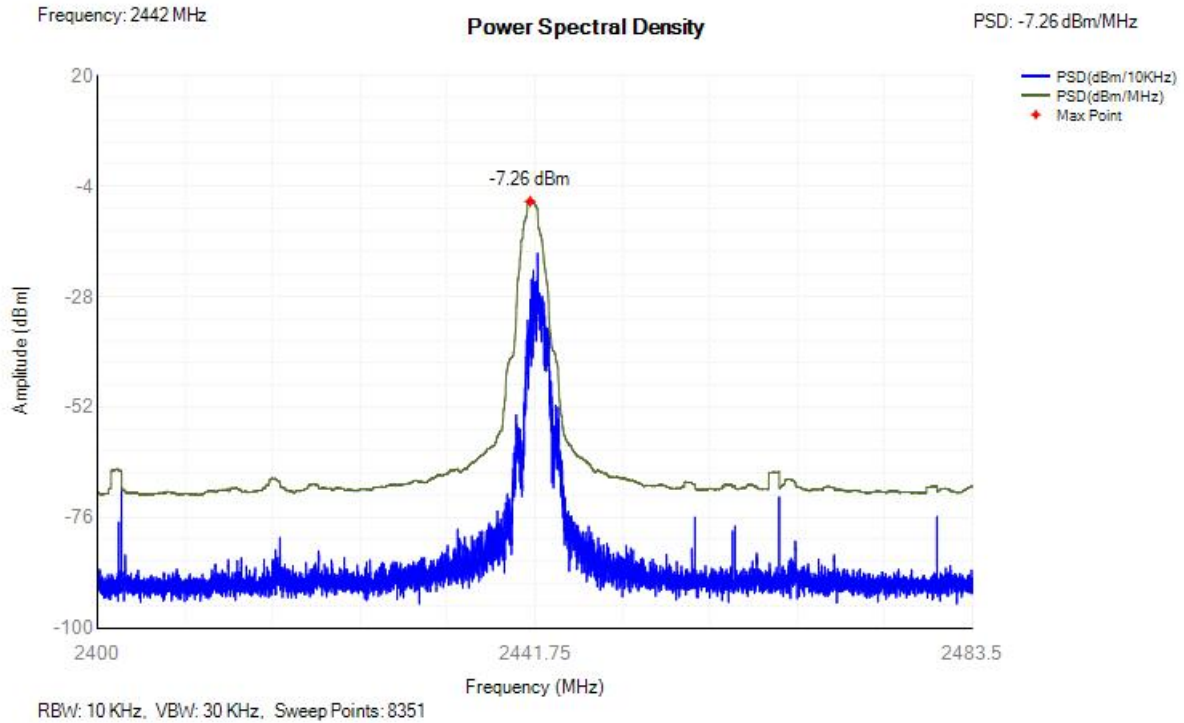
PSD NVNT BLE 1M 2480MHz Ant1



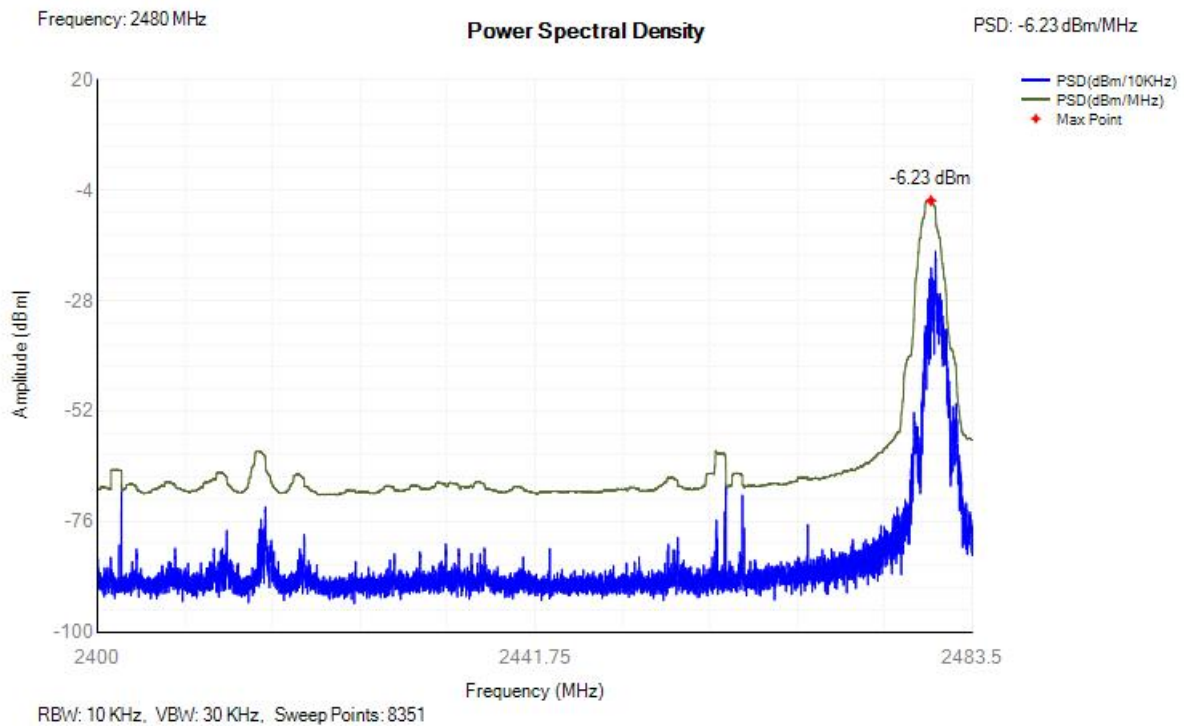
PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2442MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1



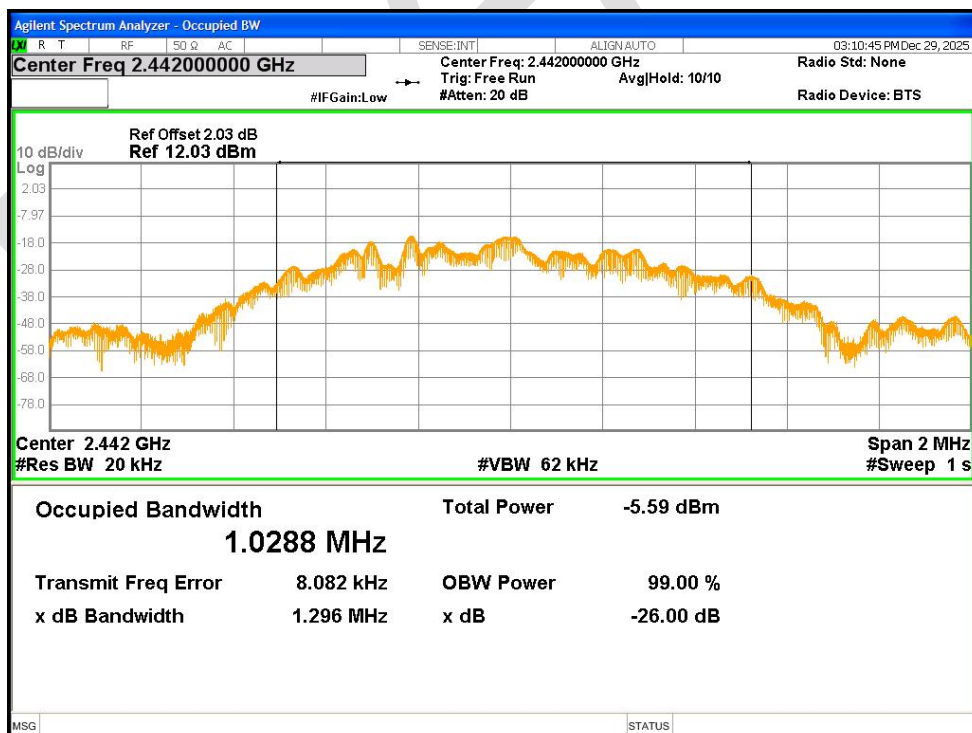
7.1.3 Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	Center Frequency (MHz)	OBW (MHz)	Lower Edge (MHz)	Upper Edge (MHz)	Limit OBW (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	2402.009	1.028	2401.495	2402.523	2400 - 2483.5MHz	Pass
NVNT	BLE 1M	2442	Ant1	2442.008	1.029	2441.494	2442.522	2400 - 2483.5MHz	Pass
NVNT	BLE 1M	2480	Ant1	2480.007	1.031	2479.492	2480.523	2400 - 2483.5MHz	Pass
NVNT	BLE 2M	2402	Ant1	2402.013	2.04	2400.993	2403.033	2400 - 2483.5MHz	Pass
NVNT	BLE 2M	2442	Ant1	2442.01	2.045	2440.988	2443.033	2400 - 2483.5MHz	Pass
NVNT	BLE 2M	2480	Ant1	2480.012	2.047	2478.988	2481.035	2400 - 2483.5MHz	Pass

OBW NVNT BLE 1M 2402MHz Ant1



OBW NVNT BLE 1M 2442MHz Ant1



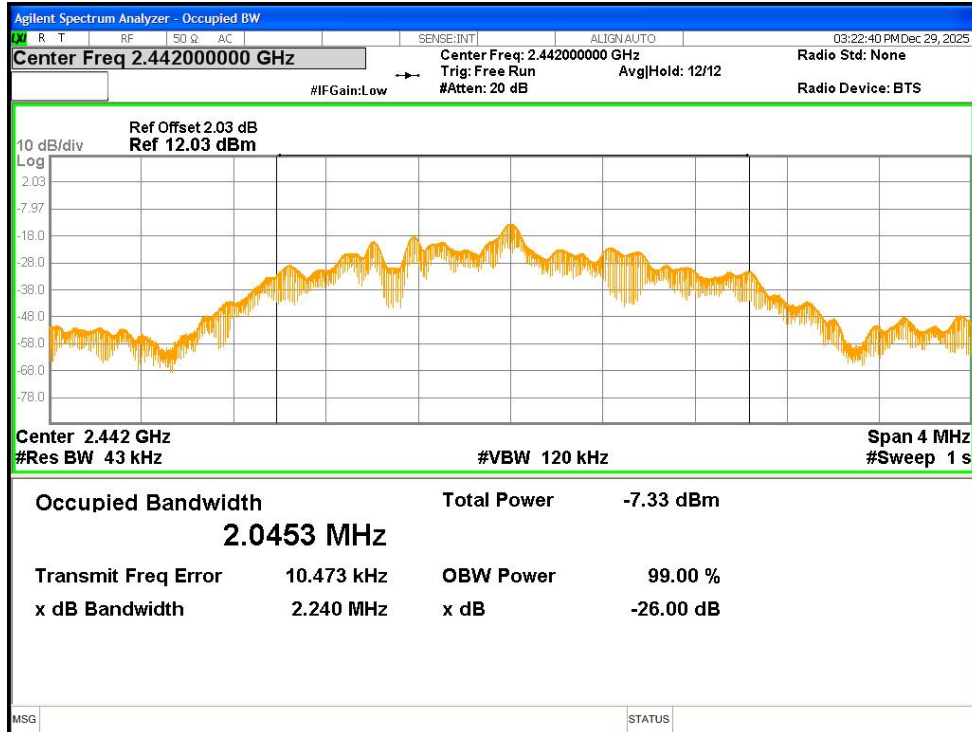
OBW NVNT BLE 1M 2480MHz Ant1



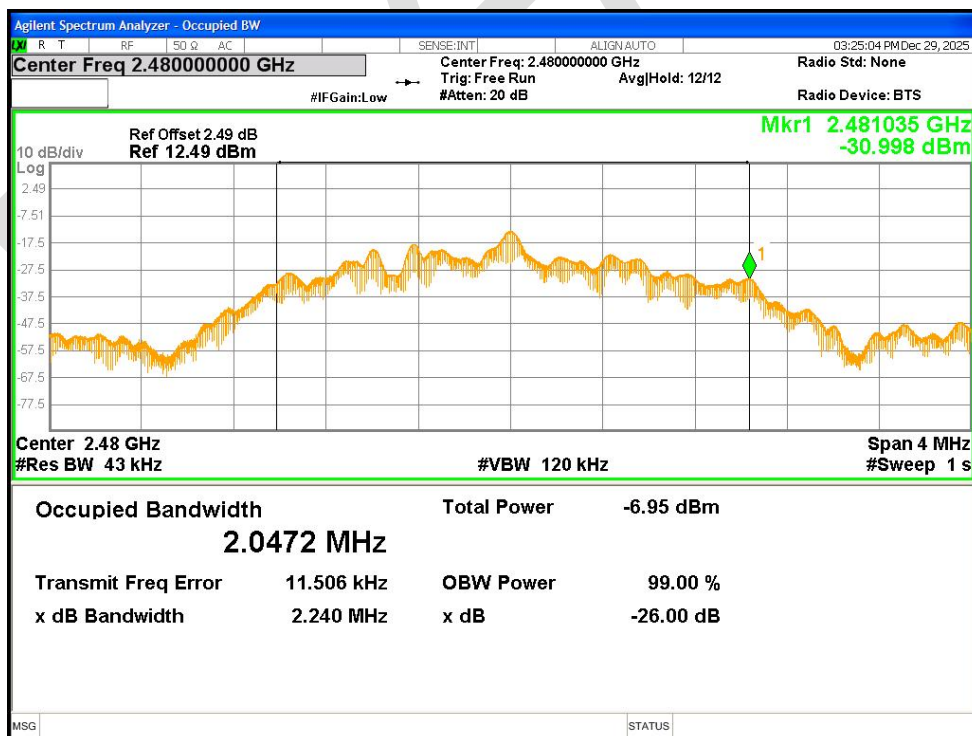
OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2442MHz Ant1



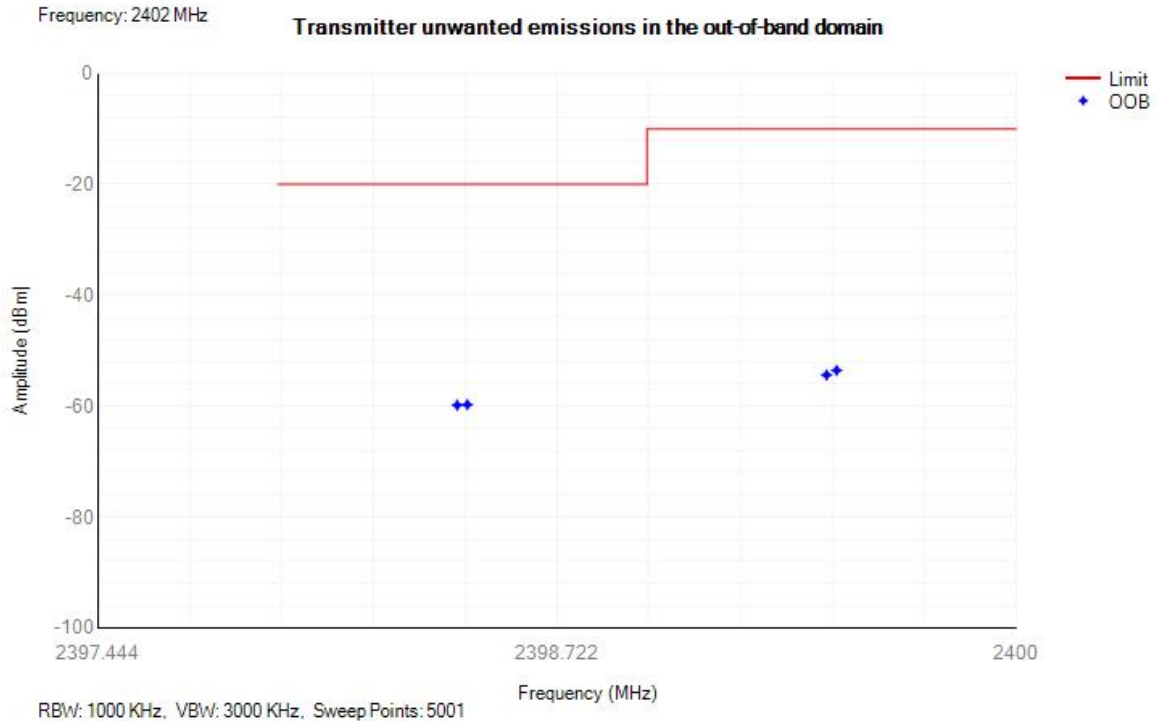
OBW NVNT BLE 2M 2480MHz Ant1



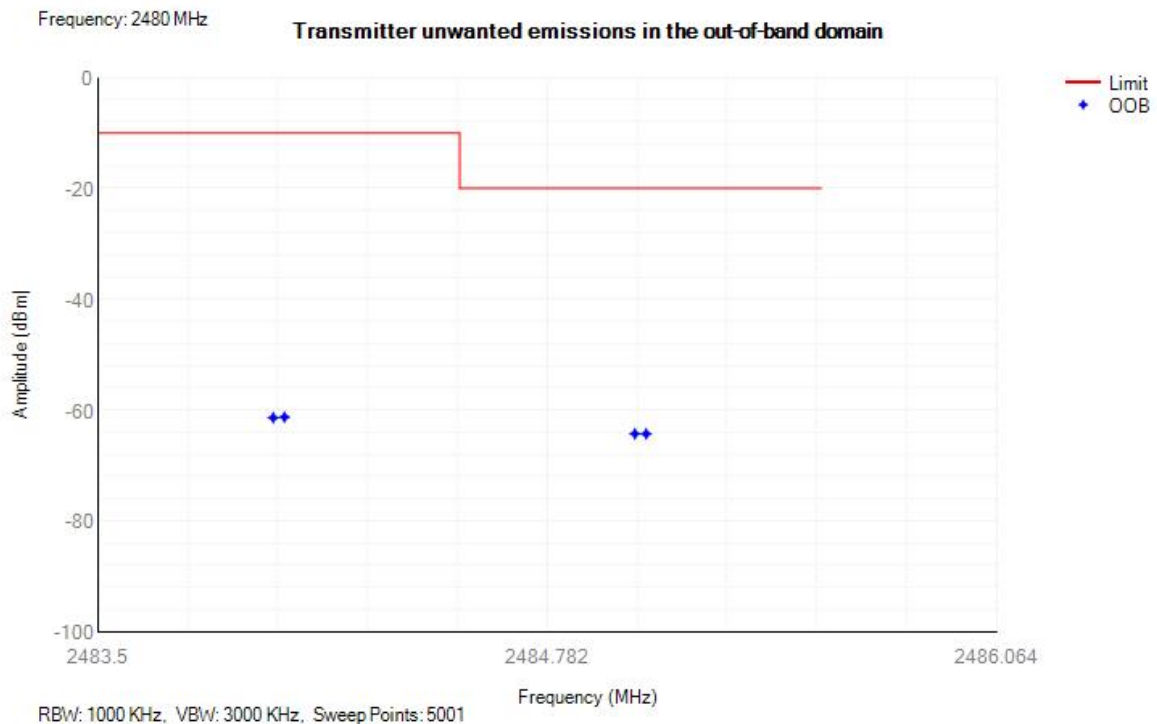
7.1.4 Transmitter unwanted emissions in the out-of-band domain

Condition	Mode	Frequency (MHz)	Antenna	OOB Frequency (MHz)	Level (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	2399.5	-53.56	-10	Pass
NVNT	BLE 1M	2402	Ant1	2399.472	-54.38	-10	Pass
NVNT	BLE 1M	2402	Ant1	2398.472	-59.73	-20	Pass
NVNT	BLE 1M	2402	Ant1	2398.444	-59.83	-20	Pass
NVNT	BLE 1M	2480	Ant1	2484	-61.38	-10	Pass
NVNT	BLE 1M	2480	Ant1	2484.032	-61.26	-10	Pass
NVNT	BLE 1M	2480	Ant1	2485.032	-64.27	-20	Pass
NVNT	BLE 1M	2480	Ant1	2485.064	-64.28	-20	Pass
NVNT	BLE 2M	2402	Ant1	2399.5	-41.12	-10	Pass
NVNT	BLE 2M	2402	Ant1	2398.5	-56.4	-10	Pass
NVNT	BLE 2M	2402	Ant1	2398.461	-56.61	-10	Pass
NVNT	BLE 2M	2402	Ant1	2397.461	-60.19	-20	Pass
NVNT	BLE 2M	2402	Ant1	2396.461	-62.4	-20	Pass
NVNT	BLE 2M	2402	Ant1	2396.422	-62.62	-20	Pass
NVNT	BLE 2M	2480	Ant1	2484	-58.85	-10	Pass
NVNT	BLE 2M	2480	Ant1	2485	-61.29	-10	Pass
NVNT	BLE 2M	2480	Ant1	2485.049	-61.27	-10	Pass
NVNT	BLE 2M	2480	Ant1	2486.049	-63.66	-20	Pass
NVNT	BLE 2M	2480	Ant1	2487.049	-64.95	-20	Pass
NVNT	BLE 2M	2480	Ant1	2487.098	-65.2	-20	Pass

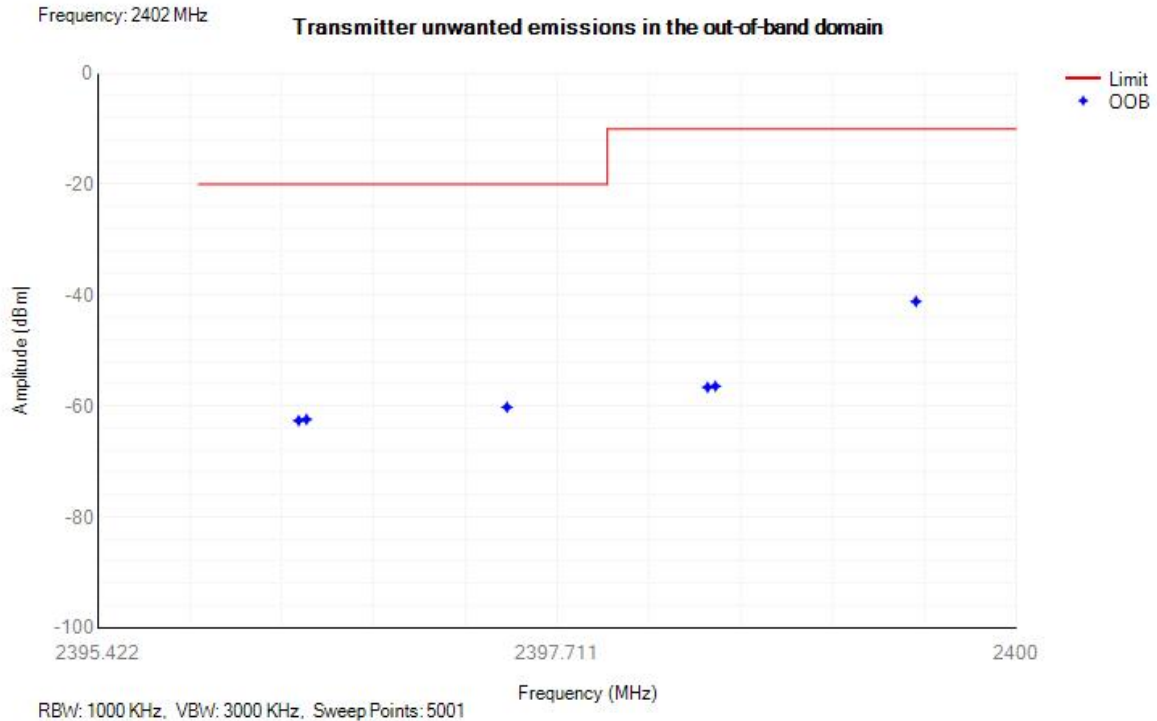
Tx. Emissions OOB NVNT BLE 1M 2402MHz Ant1



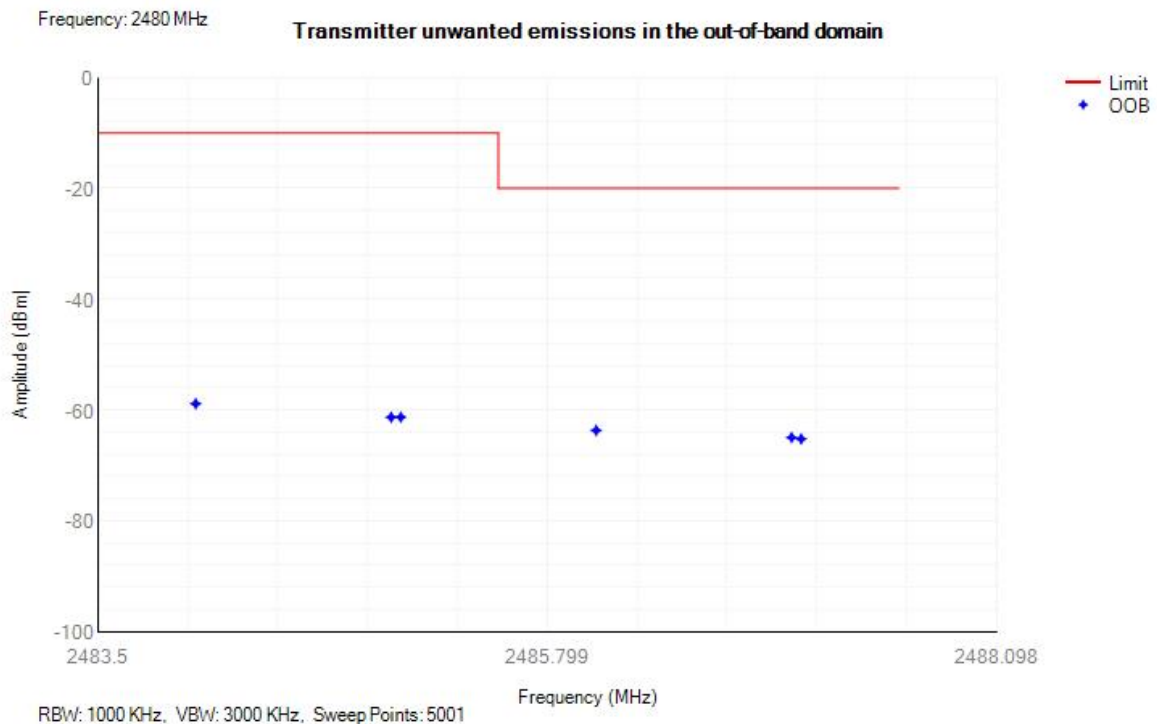
Tx. Emissions OOB NVNT BLE 1M 2480MHz Ant1



Tx. Emissions OOB NVNT BLE 2M 2402MHz Ant1



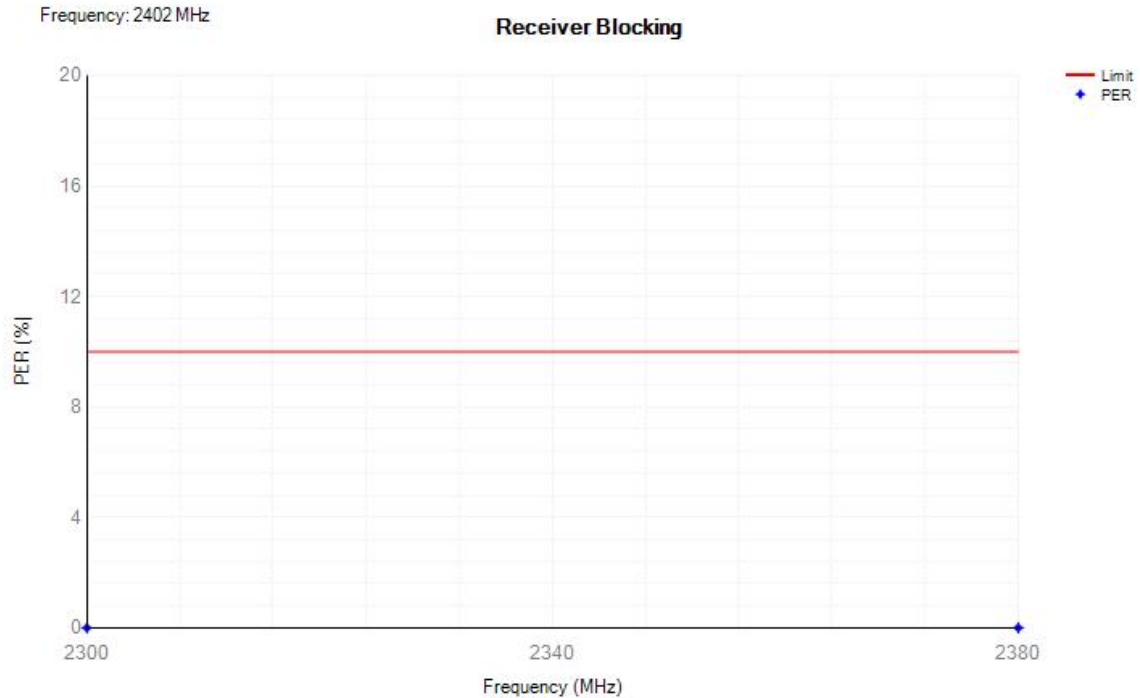
Tx. Emissions OOB NVNT BLE 2M 2480MHz Ant1



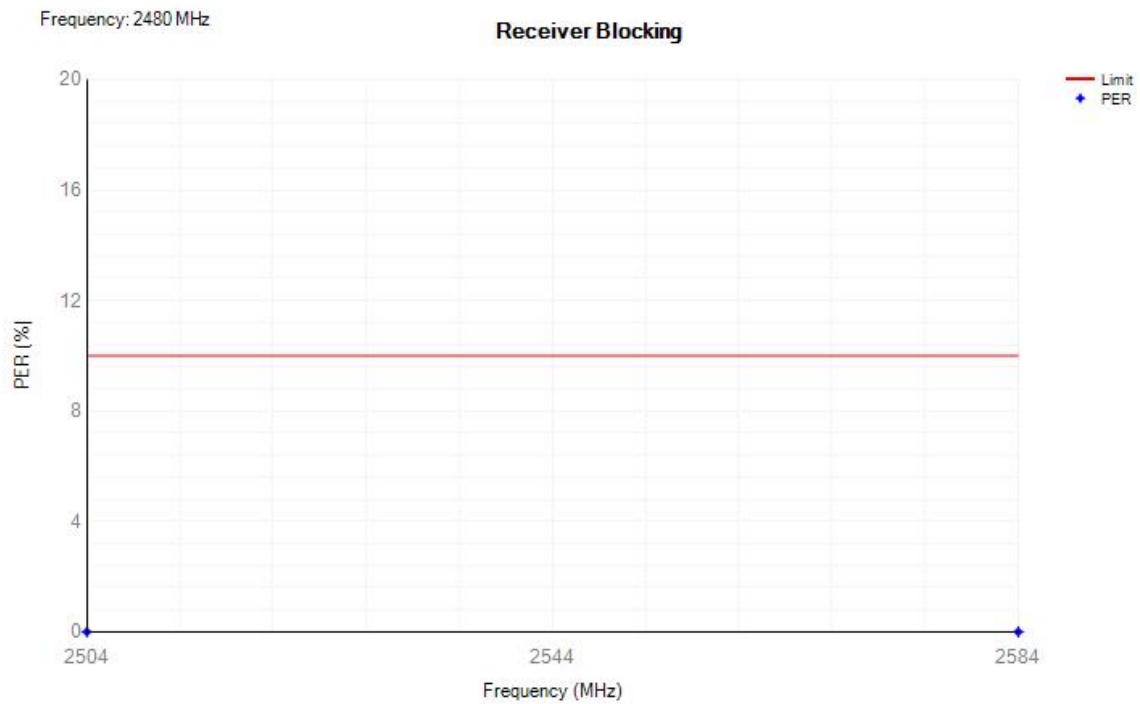
7.1.5 Receiver Blocking

Condition	Mode	Frequency (MHz)	Antenna	Wanted Power (dBm)	Blocking Frequency (MHz)	Blocking Power (dBm)	PER (%)	Limit (%)	Verdict
NVNT	BLE 1M	2402	Ant1	-59.88	2380	-35	0	10	Pass
NVNT	BLE 1M	2402	Ant1	-59.88	2300	-35	0	10	Pass
NVNT	BLE 1M	2480	Ant1	-59.86	2504	-35	0	10	Pass
NVNT	BLE 1M	2480	Ant1	-59.86	2584	-35	0	10	Pass
NVNT	BLE 2M	2402	Ant1	-56.91	2380	-35	0	10	Pass
NVNT	BLE 2M	2402	Ant1	-56.91	2300	-35	0	10	Pass
NVNT	BLE 2M	2480	Ant1	-56.88	2504	-35	0	10	Pass
NVNT	BLE 2M	2480	Ant1	-56.88	2584	-35	0	10	Pass

Rx. Blockings NVNT BLE 1M 2402MHz Ant1



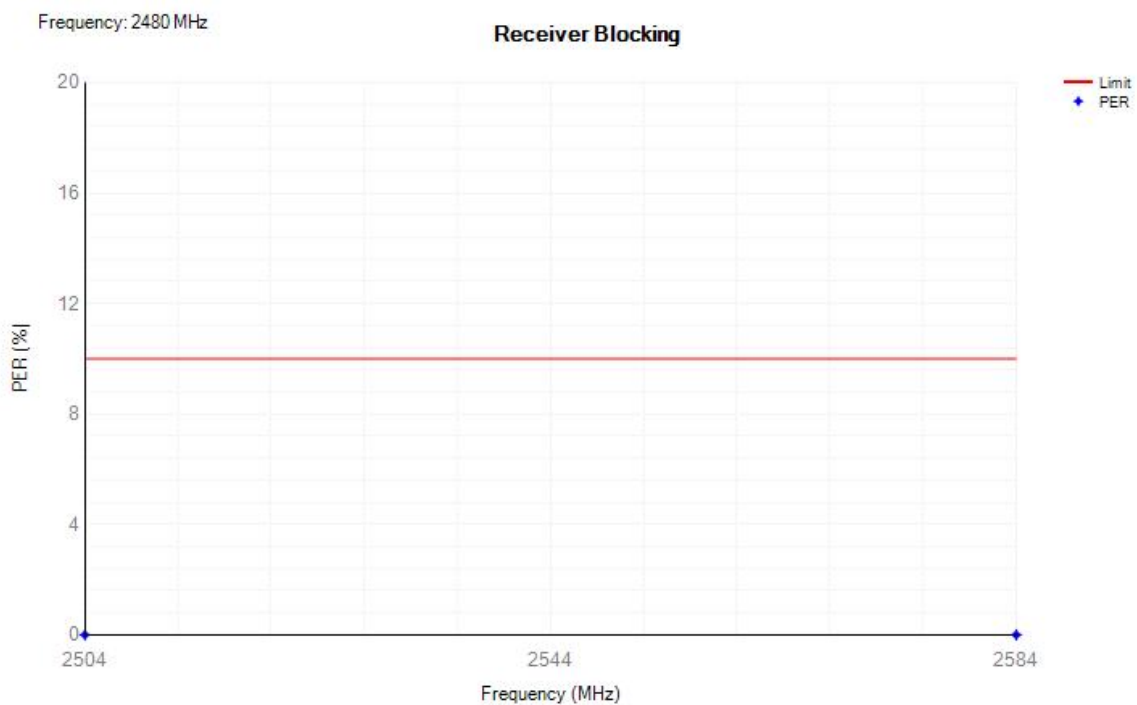
Rx. Blockings NVNT BLE 1M 2480MHz Ant1



Rx. Blockings NVNT BLE 2M 2402MHz Ant1



Rx. Blockings NVNT BLE 2M 2480MHz Ant1



Appendix B: photographs of test setup

Radiated Emissions (30MHz-1GHz)



Radiated Emissions (above 1GHz)



Appendix C: photographs of EUT

Reference to the test report no. BLA-EMC-202511-A9901

----END OF REPORT----

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