EMC REPORT

Applicant: 8devices

Address of Applicant: Antakalnio 17, Vilnius, LT-10312, Lithuania

Equipment Under Test (EUT)

Product Name: Broadband Digital Transmission System

Model No.: BLUE bean A, BLUE bean C, RED bean A, RED bean C

Applicable standards: Draft ETSI EN 301 489-1 V2.2.1 (2019-03)
Draft ETSI EN 301 489-17 V3.2.0 (2017-03)

Date of sample receipt: 28 Mar, 2019

Date of Test: 29 Mar, to 26 May, 2019

Date of report issue: 27 May, 2019

Test Result: PASS*

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

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.

Laboratory Manager

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 and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	*27 May, 2019*	*Original*

Tested by: Mike.ou ***Date:*** *27 May, 2019*

Test Engineer

Reviewed by: Wimer Zhang ***Date:*** *27 May, 2019*

Project Engineer

3 Contents

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4 Test Summary

Test Item	Test Requirement	Test Method	Application	Result
EMI Test Items				
Radiated Emission	ETSI EN301 489-1	EN 55032	Enclosure	PASS
Conducted Emission	ETSI EN301 489-1	EN 55032	AC port	PASS
Harmonic Current Emissions	ETSI EN301 489-1	EN 61000-3-2	AC port	Not Required
Voltage Fluctuations and Flicker	ETSI EN301 489-1	EN 61000-3-3	AC port	Not Required
EMS Test Items				
ESD (Electrostatic Discharge)	ETSI EN301 489-1	EN 61000-4-2	Enclosure	PASS
Radiated Immunity	ETSI EN301 489-1	EN 61000-4-3	Enclosure	PASS
EFT (Electrical Fast Transients)	ETSI EN301 489-1	EN 61000-4-4	AC port	N/A
Surge Immunity	ETSI EN301 489-1	EN 61000-4-5	AC port	N/A
Injected Currents	ETSI EN301 489-1	EN 61000-4-6	AC port	N/A
Voltage Dips andInterruptions	ETSI EN301 489-1	EN 61000-4-11	AC port	N/A
Remark: *Pass: Meet the requirement* *N/A: Not Applicable.*				

5 General Information

5.1 Client Information

Applicant:	8devices
Address:	Antakalnio 17, Vilnius, LT-10312, Lithuania
Manufacturer/Factory:	8devices
Address:	Antakalnio 17, Vilnius, LT-10312, Lithuania

5.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	BLUE bean A, BLUE bean C, RED bean A, RED bean C
Tx Frequency:	Wi-Fi: 2412MHz~2472MHz, 5180MHz~5240MHz, Bluetooth/ BLE: 2402MHz~2480MHz
Rx Frequency	Wi-Fi: 2412MHz~2472MHz, 5180MHz~5240MHz, Bluetooth/ BLE: 2402MHz~2480MHz
Hardware version:	BLUE bean A: 8dev_3201_4, BLUE bean C: 8dev_3200_3, RED bean A: 8dev_3301_3, RED bean C: 8dev_3301_4
Software version:	4.5.20.037
Modulation technology:	802.11b: DSSS, 802.11a/g/n/ac: OFDM Bluetooth BDR /BLE: GFSK, Bluetooth EDR: π/4-DQPSK, 8DPSK
Antenna Type:	Ceramic Antenna External antenna
Antenna Gain:	Ceramic Antenna: BT/ BLE: 3 dBi, 2.4Wi-Fi: 3 dBi, 5G Wi-Fi: 3 dBi External antenna A: BT/ BLE: 4 dBi, 2.4Wi-Fi: 4 dBi, 5G Wi-Fi: 4.5 dBi External antenna B: BT/ BLE: 3.2 dBi, 2.4Wi-Fi: 3.2 dBi, 5G Wi-Fi: 4.25 dBi
Power supply:	DC 3.3V
Remark:	The No.: BLUE bean A and BLUE bean C, RED bean A and RED bean C identical inside, the electrical circuit design, layout, components used and internal wiring up to RF output. with only difference as follow: 1. BLUE bean C and RED bean C RF output is connected to connector Murata HSC, BLUE bean A and RED bean A RF output is connected to connector Murata HSC and connected to antenna, to accommodate antenna PCB length is increased, antenna, antennas passive components and RF probe switch added to PCB. 2. Modules use different version of chip BLUE bean Qualcomm QCA9377-7 and RED bean Qualcomm QCA9377-3. 3. QCA9377-7 and QCA9377-3 only differs what interface it uses to connect to WIFI and BT. 4. BLUE bean QCA9377-7 uses USB2.0 for WIFI and USB1.1 for BT. 5. RED bean QCA9377-3 uses SDIO3.0 for WIFI and UART/PCM for BT. 6. Circuit design, layout components used and internal wiring for interface connection is different. 7. Pinout for module is different

5.3 Test mode

TM 1: Keep the EUT in WiFi link(2.4G WiFi and 5G WiFi) and BT link mode

5.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
LENOVO	Laptop	SL510	2847A65	DoC
ULEFONE	Adapter	HJ-0503000K7-EU	N/A	N/A
baofeng	Test suite	Pi3B+SD	N/A	N/A

5.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 30MHz)	±2.22 dB
Radiated Emission (9kHz ~ 30MHz)	±2.76 dB
Radiated Emission (30MHz ~ 1000MHz)	±4.28 dB
Radiated Emission (1GHz ~ 18GHz)	±5.72 dB
Radiated Emission (18GHz ~ 26.5GHz)	±2.88 dB

5.6 Description of Cable Used

N/A

5.7 Laboratory Facility

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

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.9 Monitoring of EUT for the Immunity Test

Visual:	N/A
Sound:	N/A
Other:	Monitored the data link of EUT

5.10 Test Instruments list

Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Simulated Station	Anritsu	MT8820C	6201026545	03-18-2019	03-17-2020
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-18-2019	03-17-2020
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-18-2019	03-17-2020
LISN	CHASE	MN2050D	1447	03-18-2019	03-17-2020
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2018	07-20-2019
ISN	Schwarzbeck	CAT3 8158	CAT3 8158 #96	03-18-2019	03-17-2020
ISN	Schwarzbeck	CAT5 8158	CAT5 8158 #166	03-18-2019	03-17-2020
ISN	Schwarzbeck	NTFM 8158	NTFM 8158 #126	03-18-2019	03-17-2020
Cable	HP	10503A	N/A	03-18-2019	03-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		

ESD:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
ESD Simulator	Haefely	ONYX30	183900	03-19-2019	03-18-2020

Radiated Immunity:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Signal Generator	Rohde & Schwarz	SMR20	1104.002.20	03-18-2019	03-17-2020
RF Amplifier 80M-1GHz	Amplifier Research	AR 150W1000	115243	03-18-2019	03-17-2020
RF Amplifier 1GHz-4.2GHz	Amplifier Research	AR 25S1G4AM1	145863	03-18-2019	03-17-2020
RF Amplifier 4GHz-6GHz	Amplifier Research	35S4G8A	247443	03-18-2019	03-17-2020
Power Meter	Rohde & Schwarz	NRVS	1020.1809.02	03-18-2019	03-17-2020
Software EMC32	Rohde & Schwarz	EMC32-S	N/A	N/A	N/A
Log-periodic Antenna	Amplifier Research	AT1080	3654	03-18-2019	03-17-2020
Antenna Tripod	Amplifier Research	TP1000A	7412	N/A	N/A
High Gain Horn Antenna	Amplifier Research	AT4002A	6987	03-18-2019	03-17-2020
Nexus Condutuining Amplifier	B&K	2690	3003552	N/A	N/A
MUTH Simulator	B&K	4227	N/A	N/A	N/A
Sound Level Calibrator	B&K	4231	N/A	N/A	N/A
Audio Analyzer	Rohde & Schwarz	UPL 16	100150	03-18-2019	03-17-2020

6 EMC Requirements Specification in ETSI EN 301489

6.1 EMI (Emission)

6.1.1 Radiated Emission

Test Requirement:	ETSI EN 301 489 -1
Test Method:	EN 55032
Test Frequency Range:	30MHz to 6GHz
Test Distance:	3m

Receiver setup:

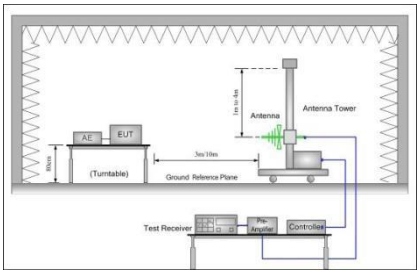
Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100kHz	300kHz	QP Value
Above 1GHz	Peak	1MHz	3MHz	PK Value
	Average	1MHz	3MHz	AV Value

Limit:

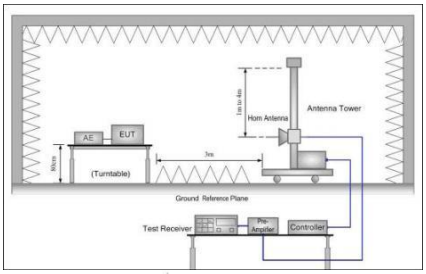
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-230MHz	40.0	QP Value
230MHz-1GHz	47.0	QP Value
1GHz-3GHz	50.0	AV Value
	70.0	PK Value
3GHz-6GHz	54.0	AV Value
	74.0	PK Value

Test setup:

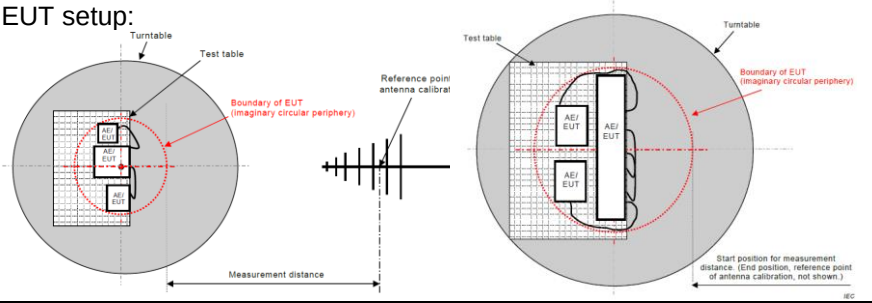
Below 1GHz:



Above 1GHz:



EUT setup:



Test Procedure:

30MHz to 1GHz:

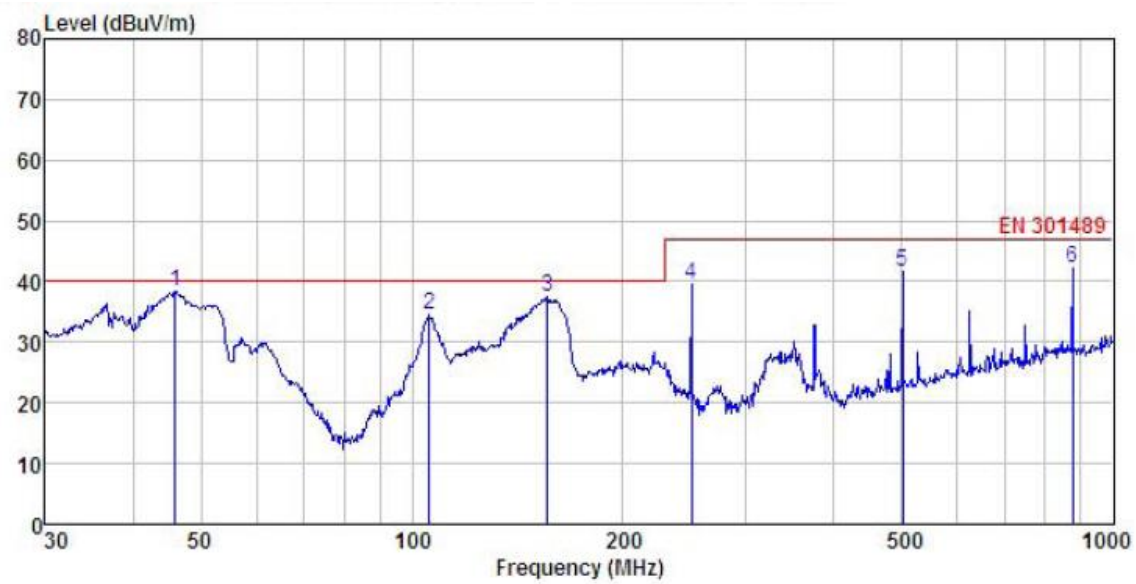
1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

	Above 1GHz: 1. The radiated emissions test was conducted in a fully-anechoic chamber. 2. The tabletop EUT was placed upon anon-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Below 1GHz:

Product Name:	Broadband Digital Transmission System	**Product Model:**	BLUE bean A
Test By:	Mike	**Test mode:**	TM 1
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 230/50Hz	**Environment:**	Temp: 24℃ Huni: 57%

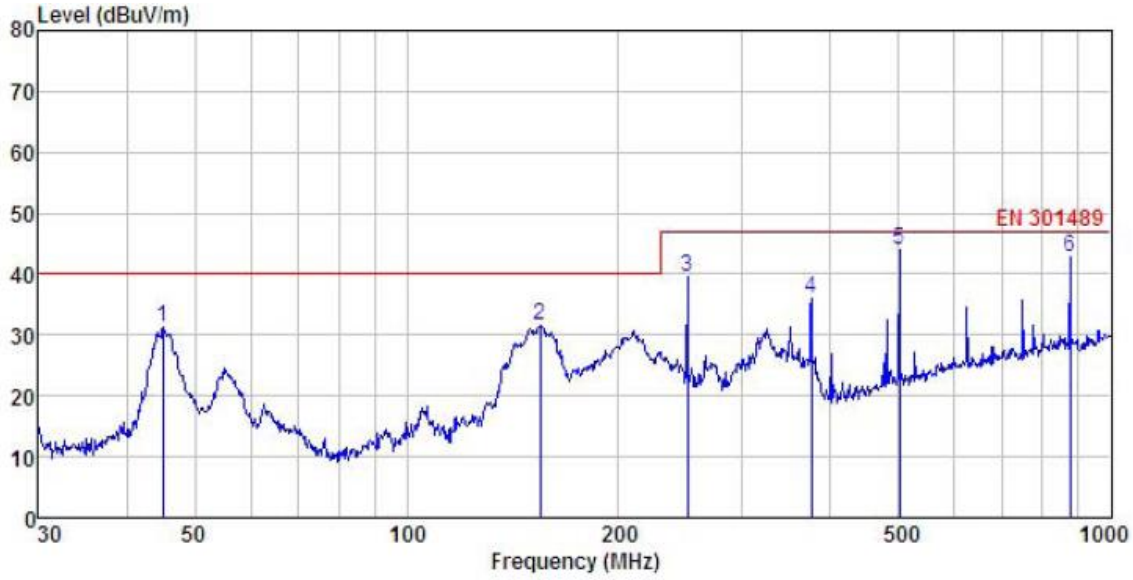


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	46.016	54.62	12.26	1.28	29.85	38.31	40.00	-1.69	QP
2	106.013	49.95	11.98	2.01	29.48	34.46	40.00	-5.54	QP
3	155.910	54.98	9.12	2.56	29.17	37.49	40.00	-2.51	QP
4	250.301	52.50	12.70	2.81	28.54	39.47	47.00	-7.53	QP
5	501.179	48.66	18.20	3.63	28.96	41.53	47.00	-5.47	QP
6	875.247	43.57	22.55	3.95	27.94	42.13	47.00	-4.87	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	BLUE bean A
Test By:	Mike	Test mode:	TM 1
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%



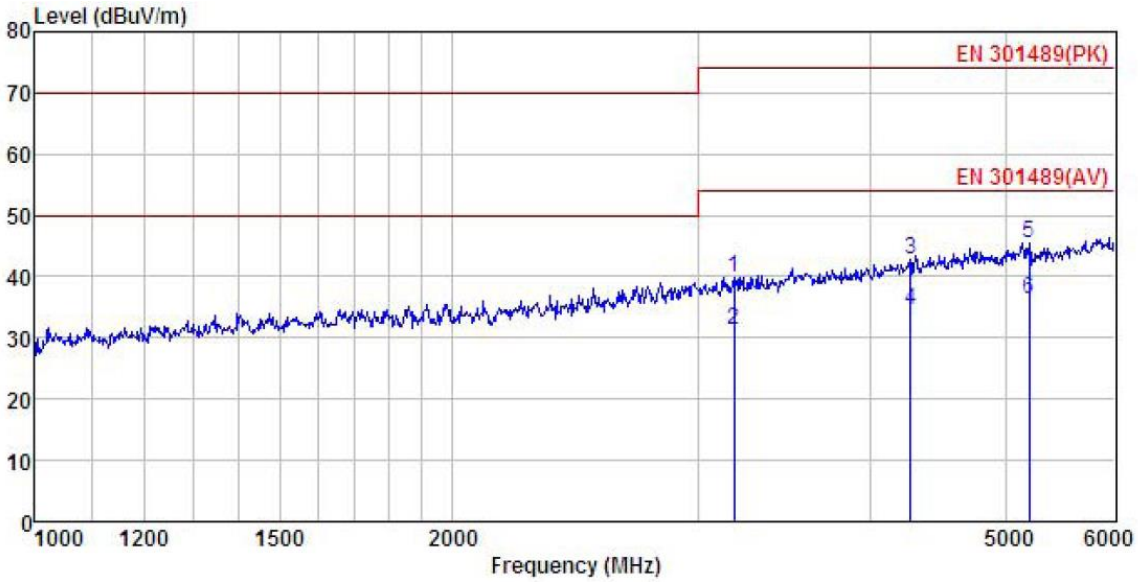
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.058	47.59	12.30	1.29	29.86	31.32	40.00	-8.68	QP
2	154.821	49.11	9.10	2.55	29.18	31.58	40.00	-8.42	QP
3	250.301	52.70	12.70	2.81	28.54	39.67	47.00	-7.33	QP
4	375.939	46.60	14.97	3.09	28.68	35.98	47.00	-11.02	QP
5	501.179	51.08	18.20	3.63	28.96	43.95	47.00	-3.05	QP
6	875.247	44.35	22.55	3.95	27.94	42.91	47.00	-4.09	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:

Product Name:	Broadband Digital Transmission System	**Product Model:**	BLUE bean A
Test By:	Mike	**Test mode:**	TM 1
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Vertical
Test Voltage:	AC 230/50Hz	**Environment:**	Temp: 24℃ Huni: 57%

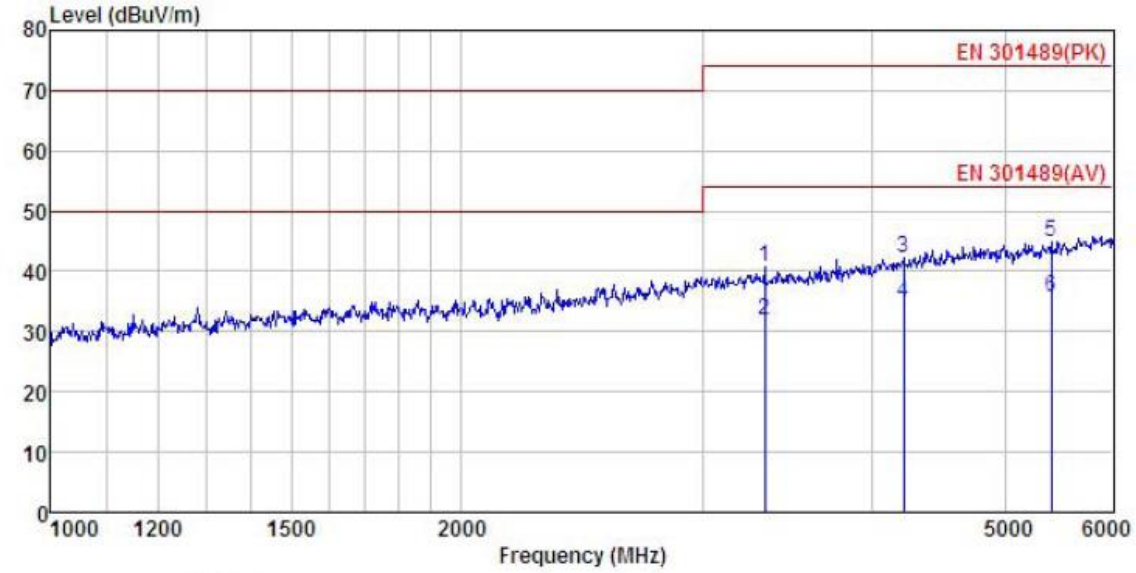


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3187.600	47.26	28.72	5.42	41.41	39.99	74.00	-34.01	Peak
2	3187.600	38.53	28.72	5.42	41.41	31.26	54.00	-22.74	Average
3	4268.768	47.53	30.70	6.50	41.86	42.87	74.00	-31.13	Peak
4	4268.768	39.32	30.70	6.50	41.86	34.66	54.00	-19.34	Average
5	5198.752	48.18	32.10	7.08	41.95	45.41	74.00	-28.59	Peak
6	5198.752	39.11	32.10	7.08	41.95	36.34	54.00	-17.66	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	BLUE bean A
Test By:	Mike	Test mode:	TM 1
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%



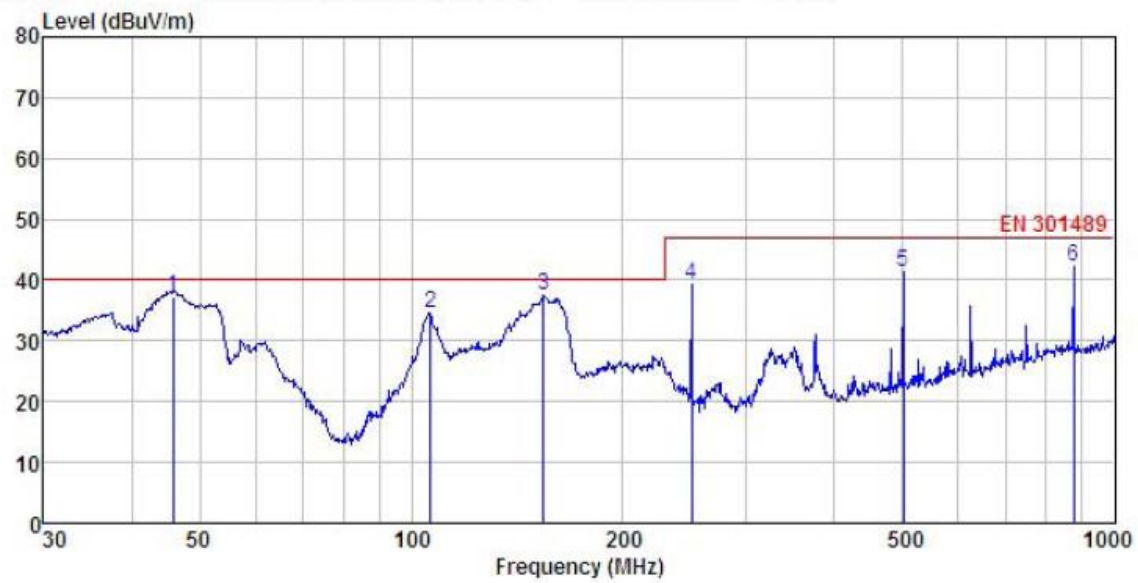
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3333.632	47.82	28.81	5.56	41.37	40.82	74.00	-33.18	Peak
2	3333.632	38.75	28.81	5.56	41.37	31.75	54.00	-22.25	Average
3	4215.562	47.01	30.60	6.43	41.82	42.22	74.00	-31.78	Peak
4	4215.562	39.68	30.60	6.43	41.82	34.89	54.00	-19.11	Average
5	5407.773	47.14	32.31	7.13	41.86	44.72	74.00	-29.28	Peak
6	5407.773	38.23	32.31	7.13	41.86	35.81	54.00	-18.19	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Below 1GHz:

Product Name:	Broadband Digital Transmission System	**Product Model:**	BLUE bean C
Test By:	Mike	**Test mode:**	TM 1
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 230/50Hz	**Environment:**	Temp: 24℃ Huni: 57%

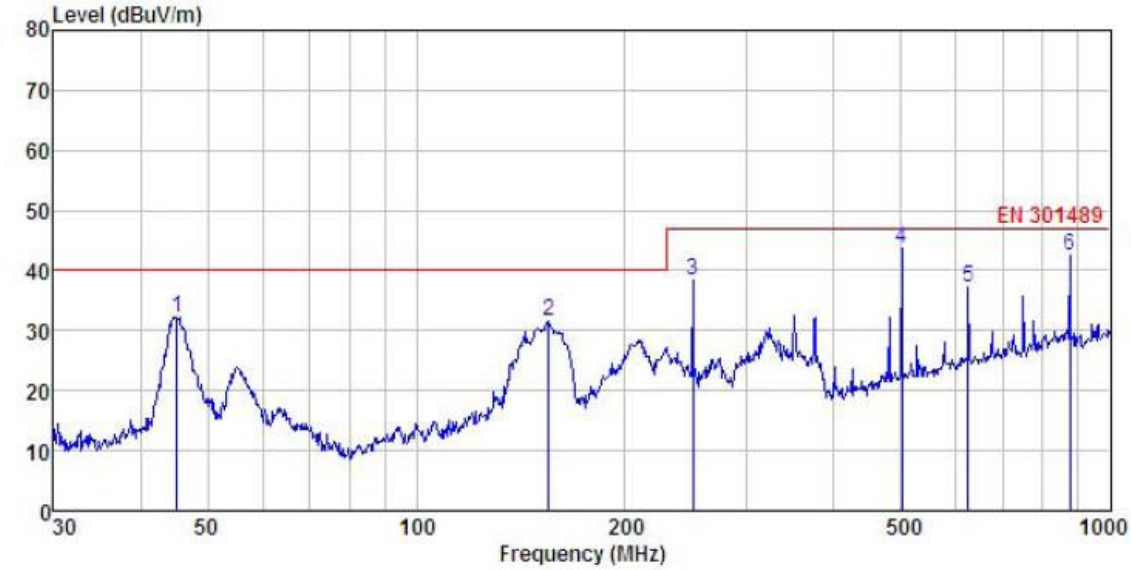


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.855	53.54	12.27	1.29	29.85	37.25	40.00	-2.75	QP
2	106.385	49.94	11.98	2.01	29.48	34.45	40.00	-5.55	QP
3	154.279	54.94	9.07	2.55	29.18	37.38	40.00	-2.62	QP
4	250.301	52.32	12.70	2.81	28.54	39.29	47.00	-7.71	QP
5	501.179	48.60	18.20	3.63	28.96	41.47	47.00	-5.53	QP
6	875.247	43.60	22.55	3.95	27.94	42.16	47.00	-4.84	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	BLUE bean C
Test By:	Mike	Test mode:	TM 1
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%



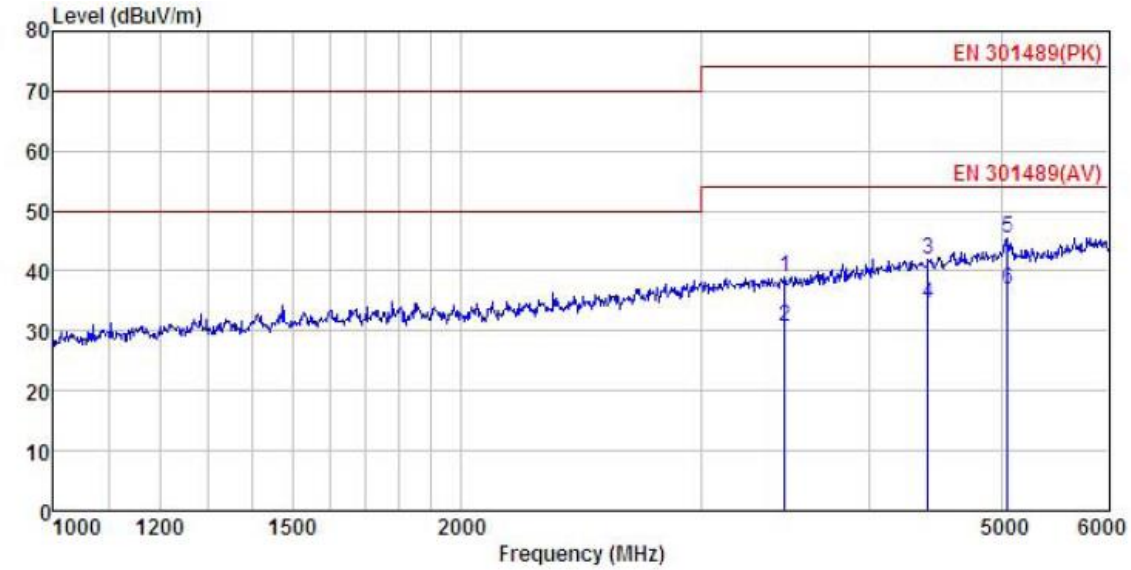
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.217	48.47	12.29	1.29	29.86	32.19	40.00	-7.81	QP
2	155.364	49.10	9.12	2.55	29.17	31.60	40.00	-8.40	QP
3	250.301	51.29	12.70	2.81	28.54	38.26	47.00	-8.74	QP
4	501.179	50.87	18.20	3.63	28.96	43.74	47.00	-3.26	QP
5	625.078	42.63	19.61	3.90	28.86	37.28	47.00	-9.72	QP
6	875.247	43.94	22.55	3.95	27.94	42.50	47.00	-4.50	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:

Product Name:	Broadband Digital Transmission System	**Product Model:**	BLUE bean C
Test By:	Mike	**Test mode:**	TM 1
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Vertical
Test Voltage:	AC 230/50Hz	**Environment:**	Temp: 24℃ Huni: 57%

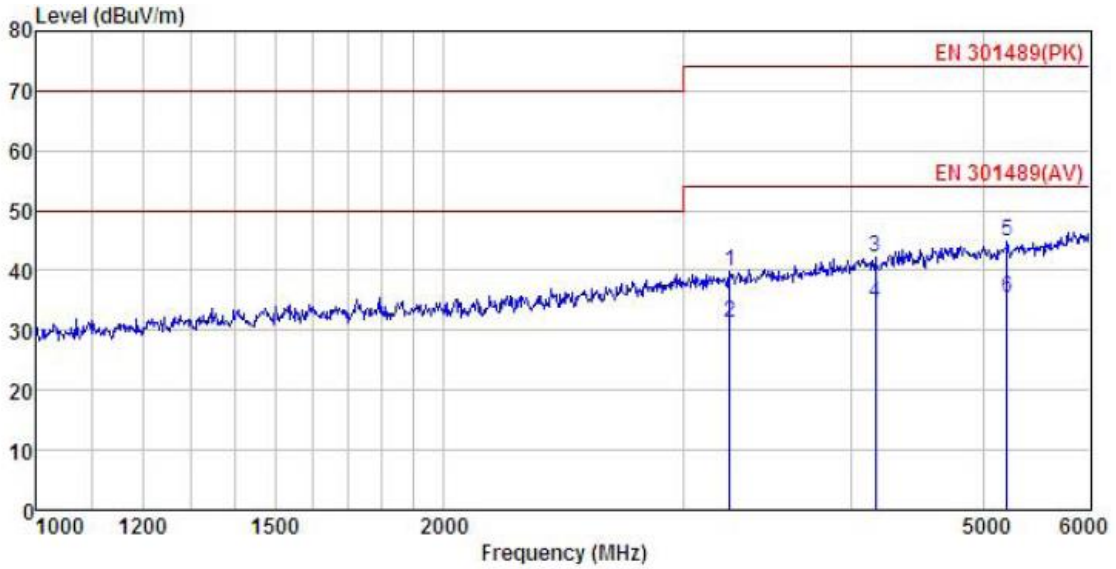


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3461.456	46.13	28.59	5.71	41.42	39.01	74.00	-34.99	Peak
2	3461.456	37.74	28.59	5.71	41.42	30.62	54.00	-23.38	Average
3	4416.593	46.90	30.39	6.72	41.98	42.03	74.00	-31.97	Peak
4	4416.593	39.30	30.39	6.72	41.98	34.43	54.00	-19.57	Average
5	5051.830	48.93	31.51	6.97	41.90	45.51	74.00	-28.49	Peak
6	5051.830	40.26	31.51	6.97	41.90	36.84	54.00	-17.16	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	BLUE bean C
Test By:	Mike	Test mode:	TM 1
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%



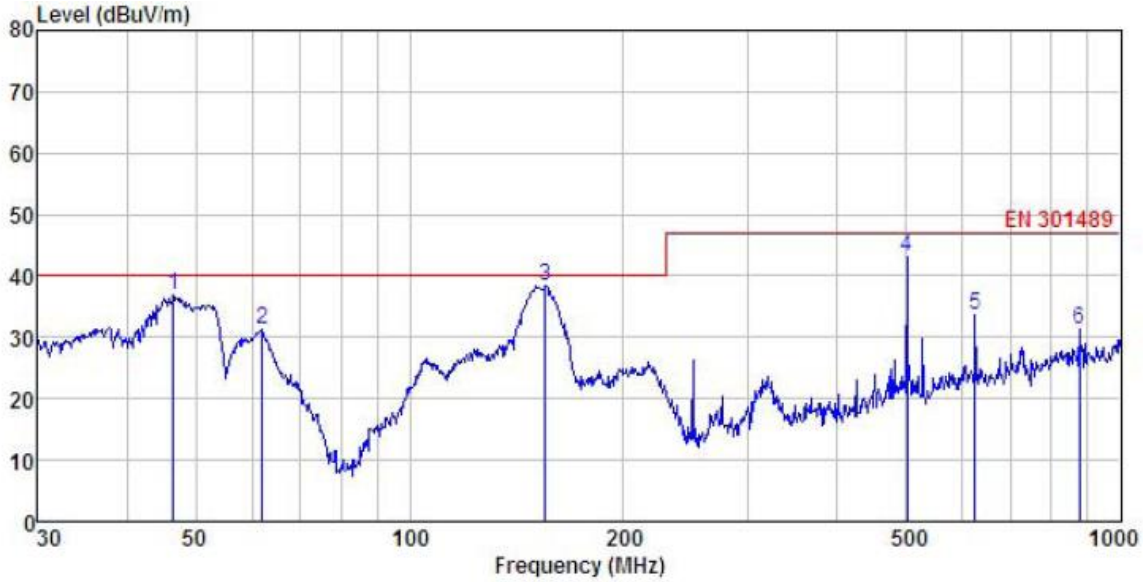
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3251.049	47.11	28.55	5.48	41.39	39.75	74.00	-34.25	Peak
2	3251.049	38.75	28.55	5.48	41.39	31.39	54.00	-22.61	Average
3	4163.019	47.39	30.33	6.34	41.81	42.25	74.00	-31.75	Peak
4	4163.019	39.80	30.33	6.34	41.81	34.66	54.00	-19.34	Average
5	5208.076	47.92	31.91	7.08	41.94	44.97	74.00	-29.03	Peak
6	5208.076	38.41	31.91	7.08	41.94	35.46	54.00	-18.54	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Below 1GHz:

Product Name:	Broadband Digital Transmission System	**Product Model:**	RED bean A
Test By:	Mike	**Test mode:**	TM 1
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 230/50Hz	**Environment:**	Temp: 24℃ Huni: 57%

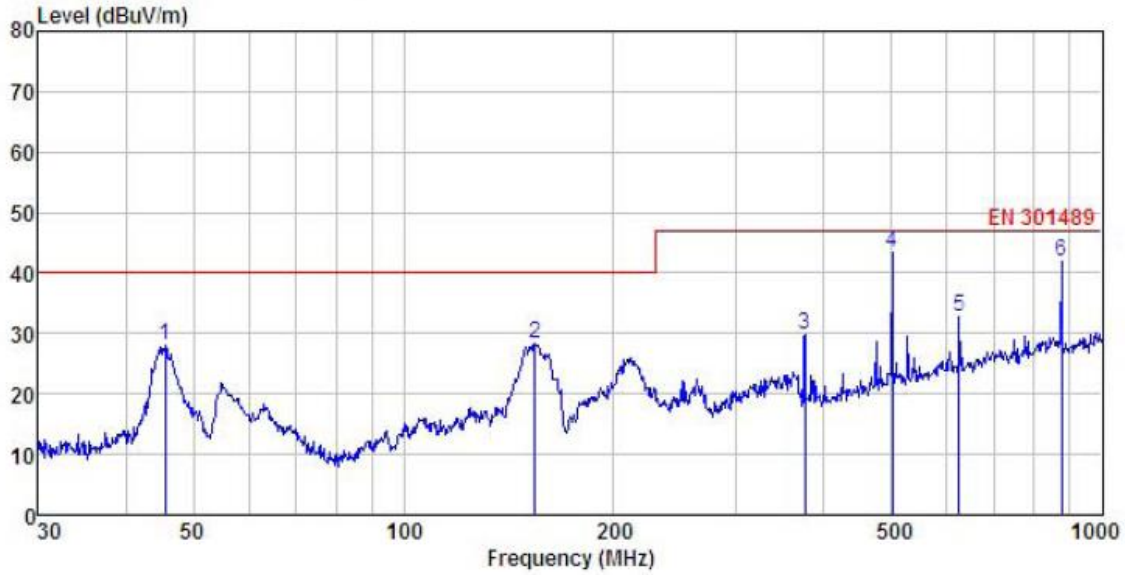


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	46.503	53.26	12.24	1.28	29.85	36.93	40.00	-3.07	QP
2	61.995	49.00	10.64	1.38	29.77	31.25	40.00	-8.75	QP
3	155.364	55.85	9.12	2.55	29.17	38.35	40.00	-1.65	QP
4	501.179	50.37	18.20	3.63	28.96	43.24	47.00	-3.76	QP
5	625.078	39.09	19.61	3.90	28.86	33.74	47.00	-13.26	QP
6	875.247	32.76	22.55	3.95	27.94	31.32	47.00	-15.68	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	RED bean A
Test By:	Mike	Test mode:	TM 1
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%



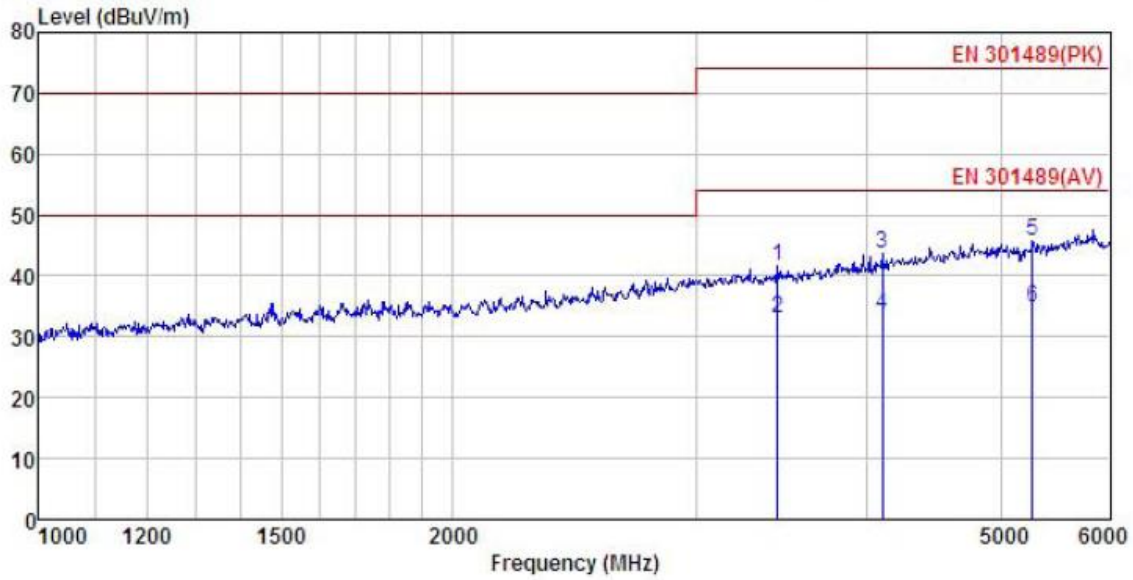
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.535	44.41	12.28	1.29	29.86	28.12	40.00	-11.88	QP
2	154.279	45.90	9.07	2.55	29.18	28.34	40.00	-11.66	QP
3	375.939	40.46	14.97	3.09	28.68	29.84	47.00	-17.16	QP
4	501.179	50.60	18.20	3.63	28.96	43.47	47.00	-3.53	QP
5	625.078	38.18	19.61	3.90	28.86	32.83	47.00	-14.17	QP
6	875.247	43.33	22.55	3.95	27.94	41.89	47.00	-5.11	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:

Product Name:	Broadband Digital Transmission System	**Product Model:**	RED bean A
Test By:	Mike	**Test mode:**	TM 1
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Vertical
Test Voltage:	AC 230/50Hz	**Environment:**	Temp: 24℃ Huni: 57%

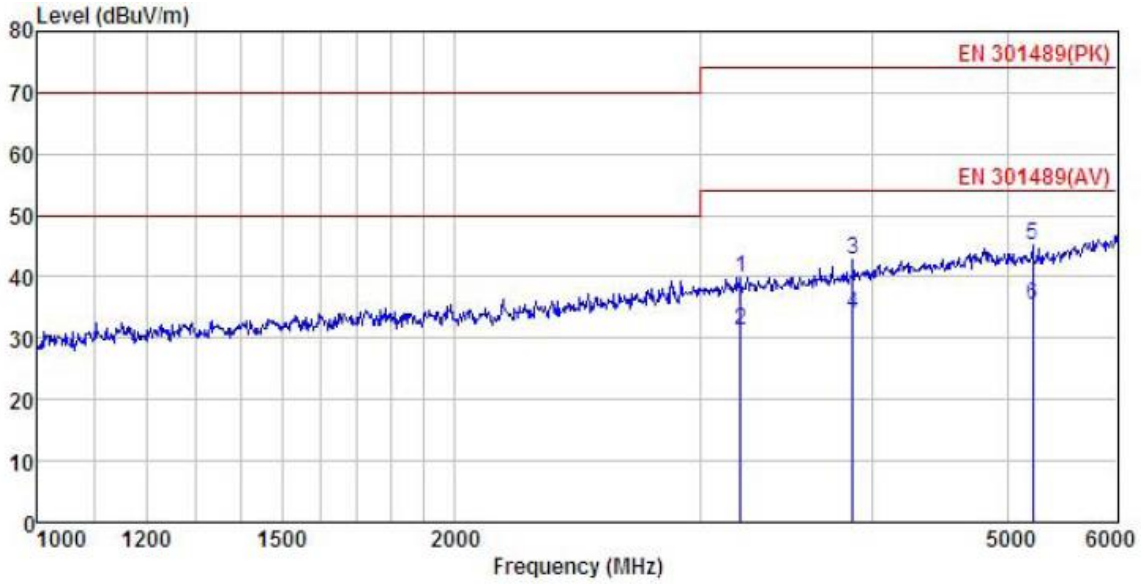


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3442.900	48.78	28.59	5.69	41.40	41.66	74.00	-32.34	Peak
2	3442.900	40.10	28.59	5.69	41.40	32.98	54.00	-21.02	Average
3	4103.771	48.95	30.32	6.25	41.81	43.71	74.00	-30.29	Peak
4	4103.771	38.92	30.32	6.25	41.81	33.68	54.00	-20.32	Average
5	5273.809	48.39	32.05	7.10	41.92	45.62	74.00	-28.38	Peak
6	5273.809	37.62	32.05	7.10	41.92	34.85	54.00	-19.15	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	RED bean A
Test By:	Mike	Test mode:	TM 1
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%



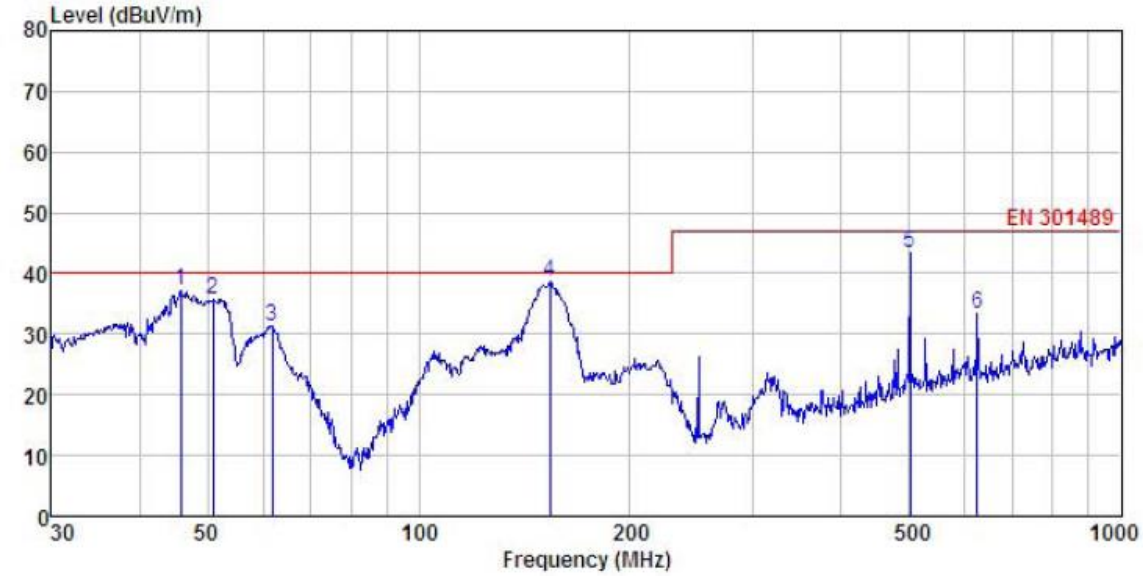
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3210.528	47.33	28.54	5.44	41.40	39.91	74.00	-34.09	Peak
2	3210.528	38.78	28.54	5.44	41.40	31.36	54.00	-22.64	Average
3	3868.158	48.69	29.87	6.09	41.80	42.85	74.00	-31.15	Peak
4	3868.158	39.66	29.87	6.09	41.80	33.82	54.00	-20.18	Average
5	5217.416	47.99	31.94	7.09	41.94	45.08	74.00	-28.92	Peak
6	5217.416	38.38	31.94	7.09	41.94	35.47	54.00	-18.53	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Below 1GHz:

Product Name:	Broadband Digital Transmission System	Product Model:	RED bean C
Test By:	Mike	Test mode:	TM 1
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%

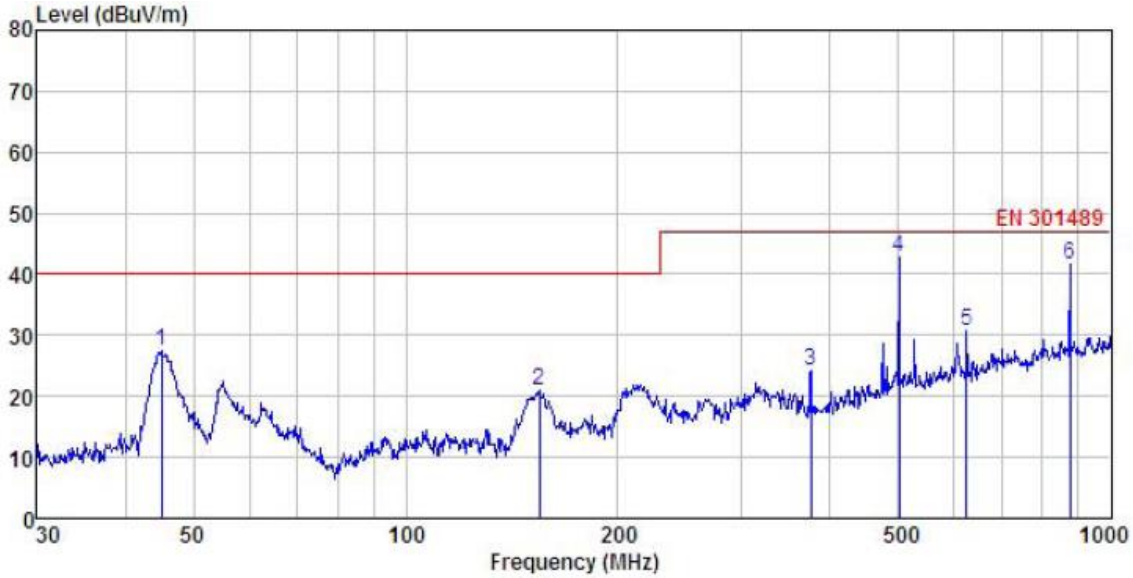


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.855	53.36	12.27	1.29	29.85	37.07	40.00	-2.93	QP
2	50.942	52.34	12.01	1.27	29.82	35.80	40.00	-4.20	QP
3	61.778	49.07	10.74	1.38	29.77	31.42	40.00	-8.58	QP
4	153.739	56.20	9.05	2.54	29.19	38.60	40.00	-1.40	QP
5	501.179	50.42	18.20	3.63	28.96	43.29	47.00	-3.71	QP
6	625.078	38.68	19.61	3.90	28.86	33.33	47.00	-13.67	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	RED bean A
Test By:	Mike	Test mode:	TM 1
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%



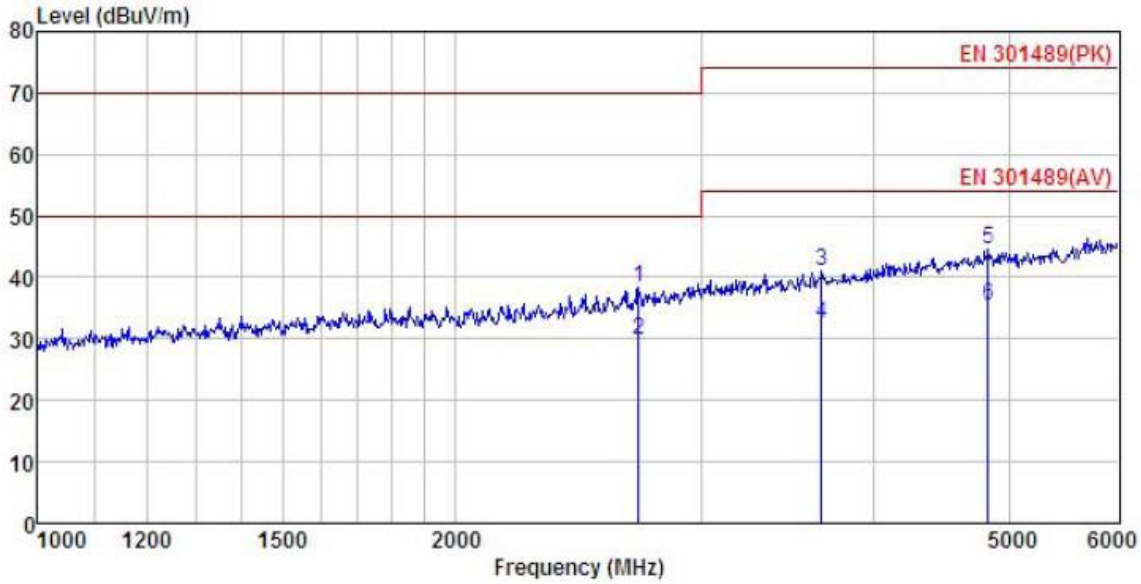
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	45.058	43.72	12.30	1.29	29.86	27.45	40.00	-12.55	QP
2	154.821	38.58	9.10	2.55	29.18	21.05	40.00	-18.95	QP
3	375.939	34.84	14.97	3.09	28.68	24.22	47.00	-22.78	QP
4	501.179	50.01	18.20	3.63	28.96	42.88	47.00	-4.12	QP
5	625.078	36.11	19.61	3.90	28.86	30.76	47.00	-16.24	QP
6	875.247	43.04	22.55	3.95	27.94	41.60	47.00	-5.40	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:

Product Name:	Broadband Digital Transmission System	**Product Model:**	RED bean C
Test By:	Mike	**Test mode:**	TM 1
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Vertical
Test Voltage:	AC 230/50Hz	**Environment:**	Temp: 24℃ Huni: 57%

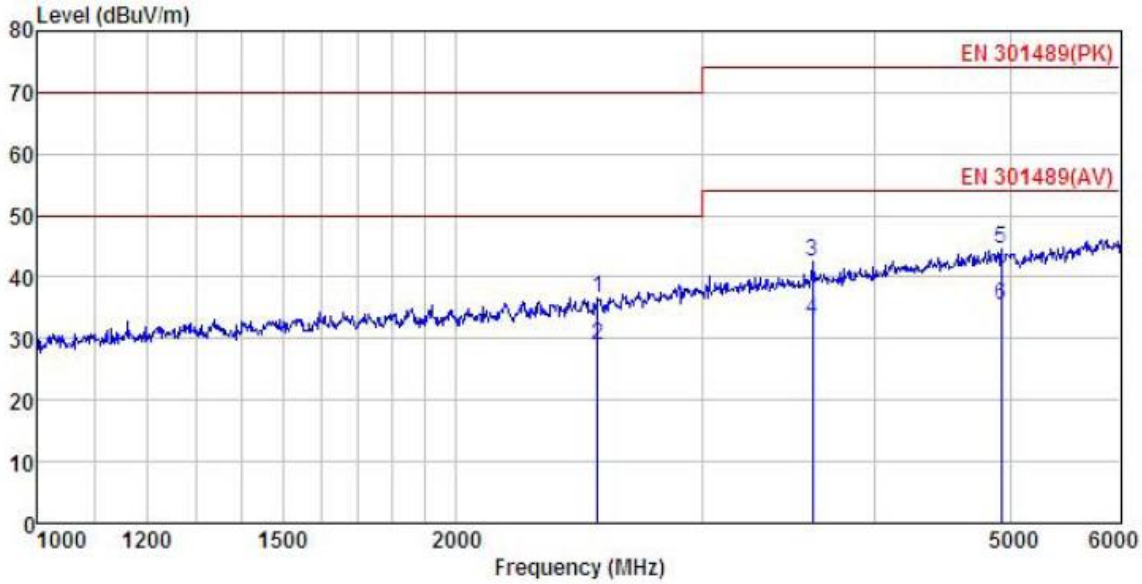


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2708.021	47.16	27.89	5.05	41.76	38.34	70.00	-31.66	Peak
2	2708.021	38.69	27.89	5.05	41.76	29.87	50.00	-20.13	Average
3	3665.723	47.50	29.18	5.95	41.62	41.01	74.00	-32.99	Peak
4	3665.723	38.95	29.18	5.95	41.62	32.46	54.00	-21.54	Average
5	4830.532	48.44	31.08	6.82	41.82	44.52	74.00	-29.48	Peak
6	4830.532	39.48	31.08	6.82	41.82	35.56	54.00	-18.44	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Broadband Digital Transmission System	Product Model:	RED bean C
Test By:	Mike	Test mode:	TM 1
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test Voltage:	AC 230/50Hz	Environment:	Temp: 24℃ Huni: 57%

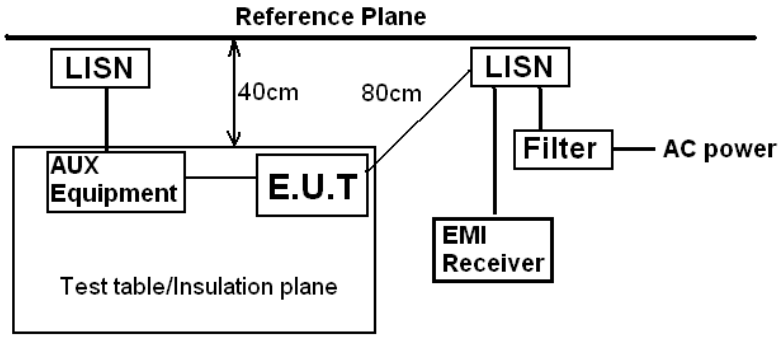


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2525.249	46.26	27.46	4.85	41.90	36.67	70.00	-33.33	Peak
2	2525.249	38.44	27.46	4.85	41.90	28.85	50.00	-21.15	Average
3	3607.084	49.20	28.98	5.90	41.55	42.53	74.00	-31.47	Peak
4	3607.084	39.79	28.98	5.90	41.55	33.12	54.00	-20.88	Average
5	4926.683	48.34	31.26	6.89	41.86	44.63	74.00	-29.37	Peak
6	4926.683	39.02	31.26	6.89	41.86	35.31	54.00	-18.69	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

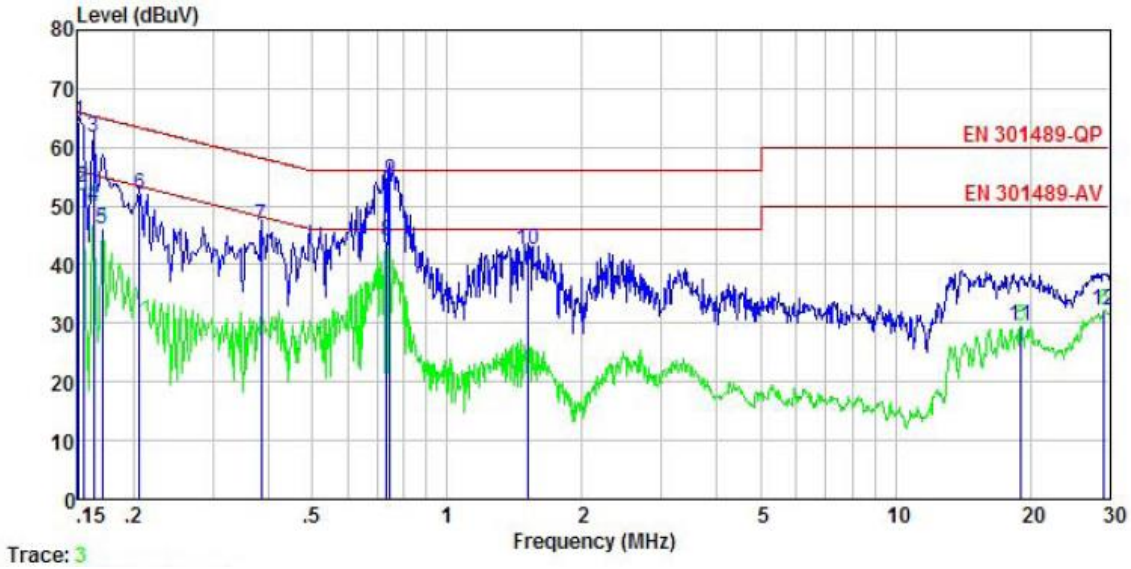
6.1.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td colspan="3">ETSI EN 301 489 -1</td></tr>
<tr><td>Test Method:</td><td colspan="3">EN 55032</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="3">150kHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="3">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="3">RBW=9kHz, VBW=30kHz</td></tr>
<tr><td>Limit:</td><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td></td><td>Quasi-peak</td><td>Average</td></tr>
<tr><td></td><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td></td><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td></td><td>5-30</td><td>60</td><td>50</td></tr>
<tr><td></td><td colspan="3">* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test setup:</td><td colspan="3"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure</td><td colspan="3">The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). Which provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55032 Class B on conducted measurement.</td></tr>
<tr><td>Test Instruments:</td><td colspan="3">Refer to section 5.10 for details</td></tr>
<tr><td>Test mode:</td><td colspan="3">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="3">Passed</td></tr>
</table>

Measurement Data:

Product name:	Broadband Digital Transmission System	**Product model:**	BLUE bean A
Test by:	Mike	**Test mode:**	TM 1
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 230 V/50 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%

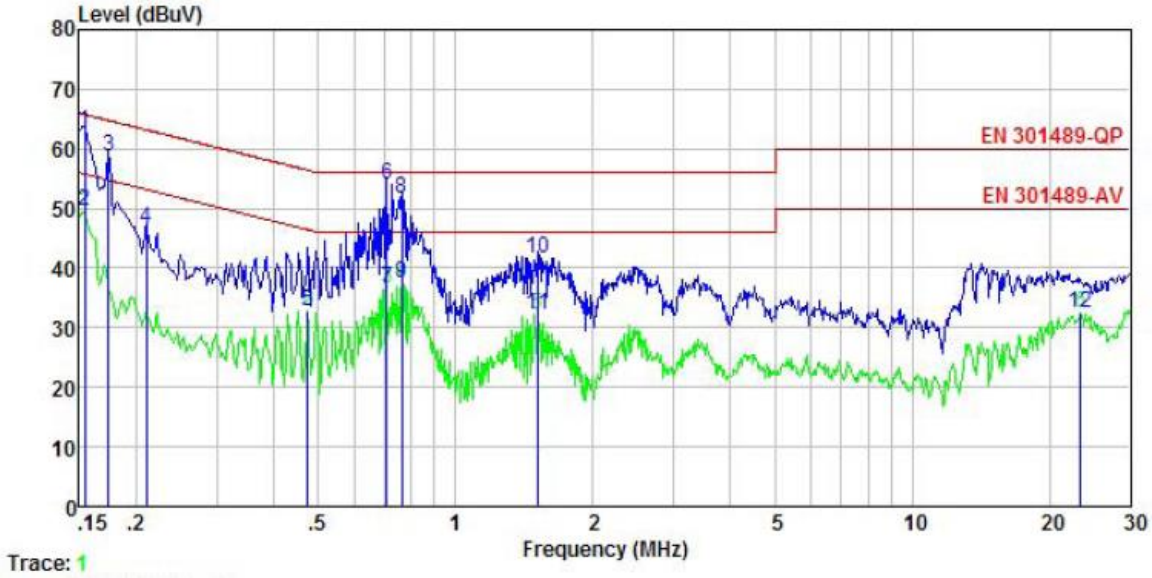


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.151	54.05	-0.45	10.78	64.38	65.96	-1.58	QP
2	0.154	42.68	-0.45	10.78	53.01	55.78	-2.77	Average
3	0.162	51.49	-0.44	10.77	61.82	65.34	-3.52	QP
4	0.162	39.56	-0.44	10.77	49.89	55.34	-5.45	Average
5	0.170	35.85	-0.43	10.77	46.19	54.94	-8.75	Average
6	0.206	41.73	-0.41	10.76	52.08	63.36	-11.28	QP
7	0.385	36.32	-0.37	10.72	46.67	58.17	-11.50	QP
8	0.731	33.51	-0.38	10.78	43.91	46.00	-2.09	Average
9	0.747	43.91	-0.38	10.79	54.32	56.00	-1.68	QP
10	1.511	32.13	-0.40	10.92	42.65	56.00	-13.35	QP
11	19.021	19.66	-0.92	10.92	29.66	50.00	-20.34	Average
12	29.216	22.39	-1.11	10.87	32.15	50.00	-17.85	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	Broadband Digital Transmission System	Product model:	BLUE bean A
Test by:	Mike	Test mode:	TM 1
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 230 V/50 Hz	Environment:	Temp: 22.5℃ Huni: 55%

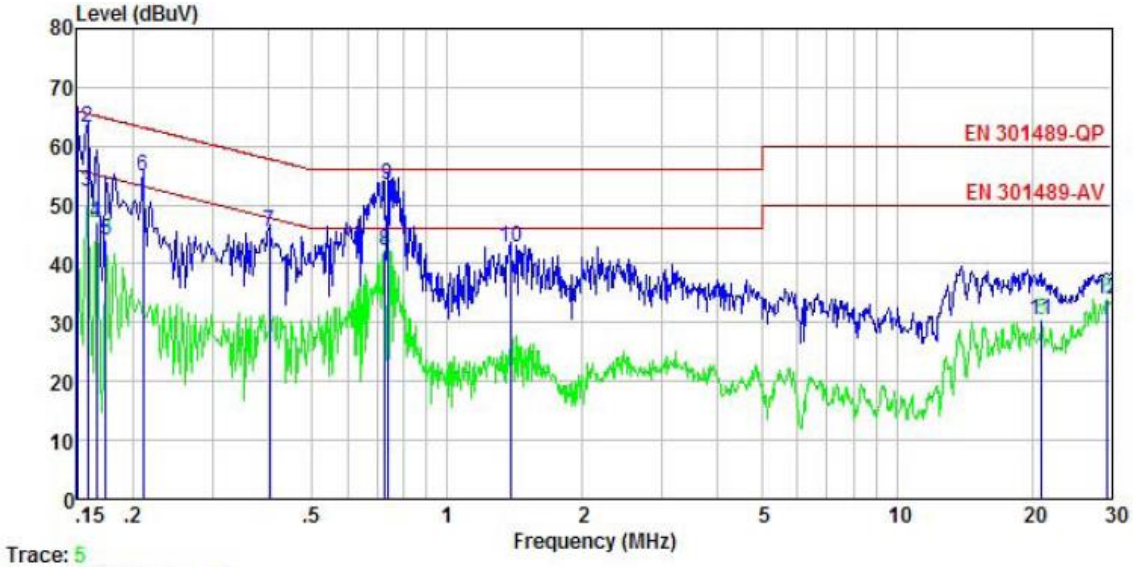


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	52.87	-0.68	10.78	62.97	65.78	-2.81	QP
2	0.154	39.48	-0.68	10.78	49.58	55.78	-6.20	Average
3	0.174	48.75	-0.69	10.77	58.83	64.77	-5.94	QP
4	0.211	36.56	-0.68	10.76	46.64	63.18	-16.54	QP
5	0.474	22.79	-0.65	10.75	32.89	46.45	-13.56	Average
6	0.708	43.98	-0.64	10.77	54.11	56.00	-1.89	QP
7	0.708	26.37	-0.64	10.77	36.50	46.00	-9.50	Average
8	0.763	41.63	-0.64	10.80	51.79	56.00	-4.21	QP
9	0.763	27.22	-0.64	10.80	37.38	46.00	-8.62	Average
10	1.511	31.49	-0.65	10.92	41.76	56.00	-14.24	QP
11	1.511	21.97	-0.65	10.92	32.24	46.00	-13.76	Average
12	23.387	23.13	-1.43	10.89	32.59	50.00	-17.41	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	Broadband Digital Transmission System	Product model:	BLUE bean C
Test by:	Mike	Test mode:	TM 1
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 230 V/50 Hz	Environment:	Temp: 22.5℃ Huni: 55%



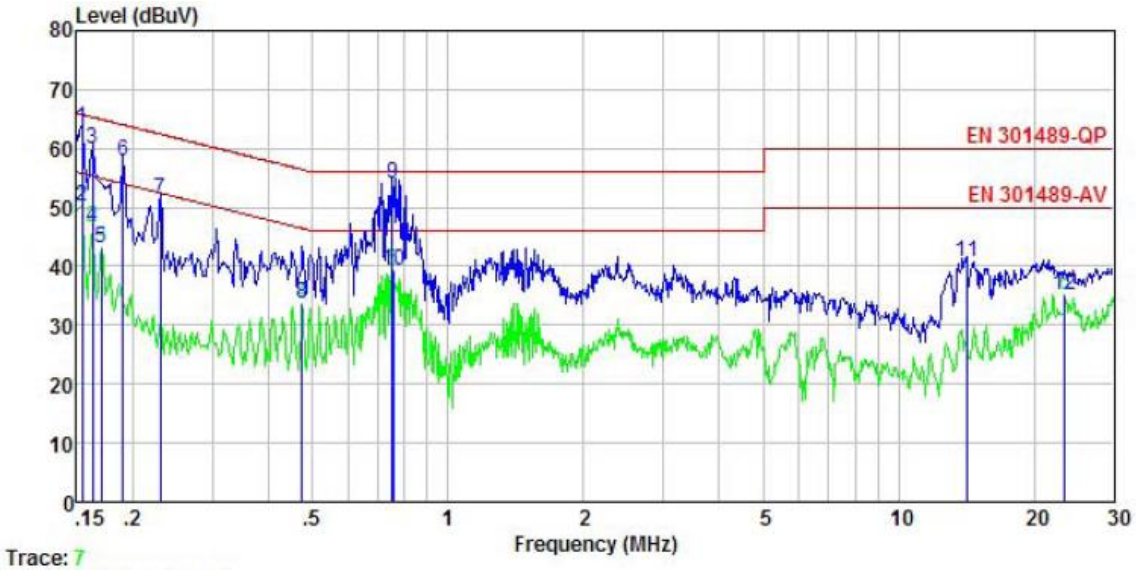
Trace: 5

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	52.73	-0.45	10.78	63.06	66.00	-2.94	QP
2	0.158	52.91	-0.44	10.77	63.24	65.56	-2.32	QP
3	0.158	41.85	-0.44	10.77	52.18	55.56	-3.38	Average
4	0.166	36.50	-0.44	10.77	46.83	55.16	-8.33	Average
5	0.174	33.78	-0.43	10.77	44.12	54.77	-10.65	Average
6	0.211	44.59	-0.41	10.76	54.94	63.18	-8.24	QP
7	0.402	35.17	-0.37	10.72	45.52	57.81	-12.29	QP
8	0.727	31.78	-0.38	10.78	42.18	46.00	-3.82	Average
9	0.735	43.15	-0.38	10.79	53.56	56.00	-2.44	QP
10	1.381	32.23	-0.39	10.91	42.75	56.00	-13.25	QP
11	21.035	20.35	-0.99	10.92	30.28	50.00	-19.72	Average
12	29.371	24.13	-1.11	10.87	33.89	50.00	-16.11	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	Broadband Digital Transmission System	Product model:	BLUE bean C
Test by:	Mike	Test mode:	TM 1
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 230 V/50 Hz	Environment:	Temp: 22.5℃ Huni: 55%

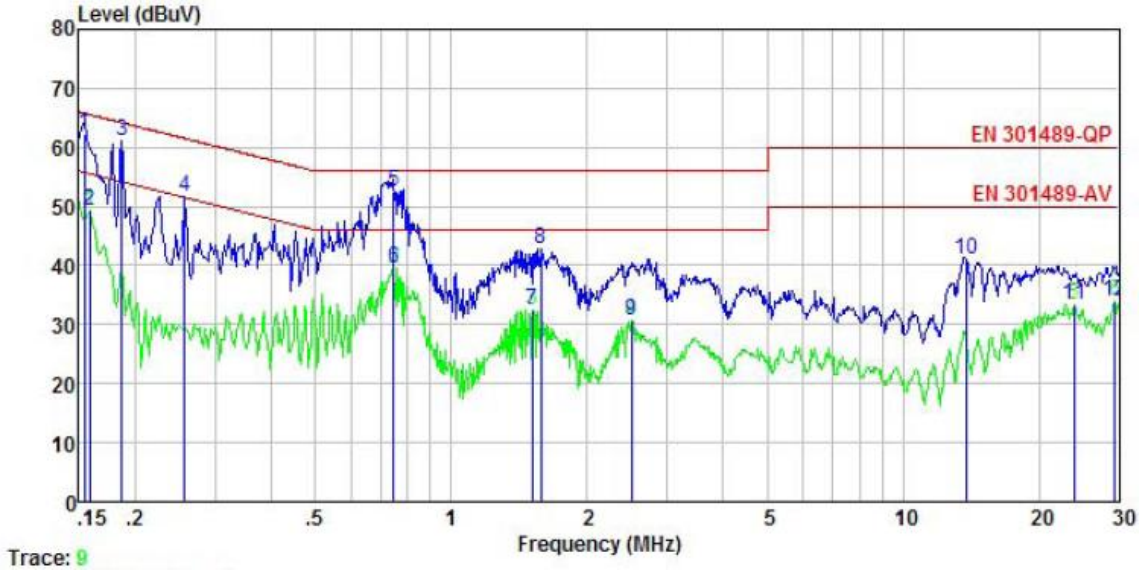


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	53.25	-0.68	10.78	63.35	65.78	-2.43	QP
2	0.154	40.08	-0.68	10.78	50.18	55.78	-5.60	Average
3	0.162	49.83	-0.68	10.77	59.92	65.34	-5.42	QP
4	0.162	36.58	-0.68	10.77	46.67	55.34	-8.67	Average
5	0.170	33.04	-0.68	10.77	43.13	54.94	-11.81	Average
6	0.190	47.80	-0.69	10.76	57.87	64.02	-6.15	QP
7	0.230	41.20	-0.67	10.75	51.28	62.44	-11.16	QP
8	0.474	23.69	-0.65	10.75	33.79	46.45	-12.66	Average
9	0.751	43.82	-0.64	10.79	53.97	56.00	-2.03	QP
10	0.755	29.22	-0.64	10.79	39.37	46.00	-6.63	Average
11	14.138	30.55	-0.81	10.91	40.65	60.00	-19.35	QP
12	23.387	25.79	-1.43	10.89	35.25	50.00	-14.75	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	Broadband Digital Transmission System	Product model:	RED bean A
Test by:	Mike	Test mode:	TM 1
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 230 V/50 Hz	Environment:	Temp: 22.5℃ Huni: 55%

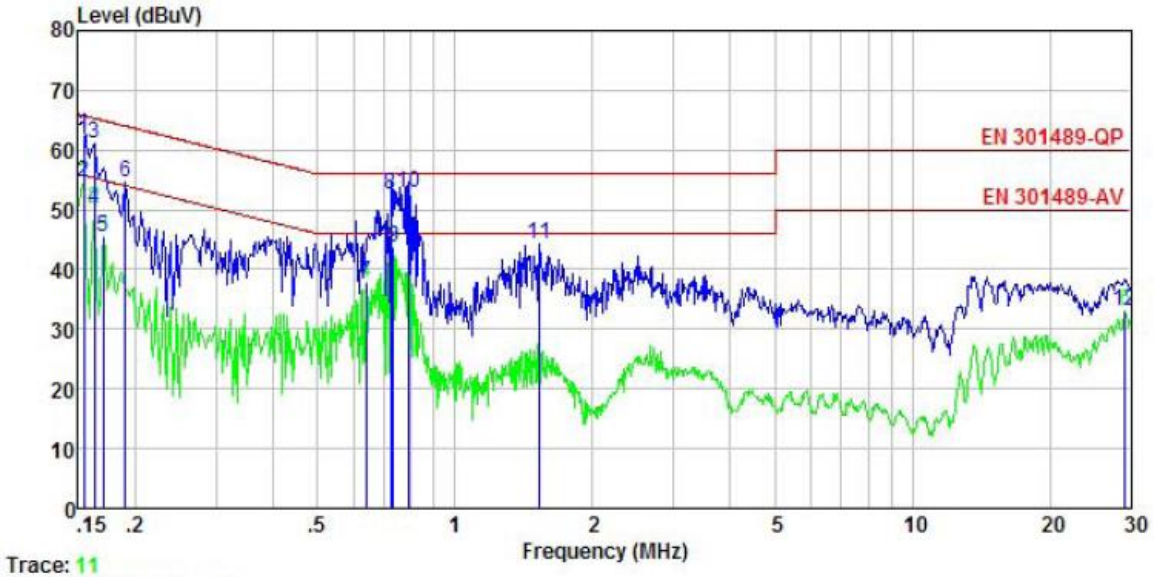


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	52.33	-0.68	10.78	62.43	65.78	-3.35	Peak
2	0.158	39.20	-0.68	10.77	49.29	55.56	-6.27	Average
3	0.186	51.00	-0.69	10.76	61.07	64.20	-3.13	Peak
4	0.258	41.50	-0.65	10.75	51.60	61.51	-9.91	Peak
5	0.747	42.42	-0.64	10.79	52.57	56.00	-3.43	Peak
6	0.747	29.48	-0.64	10.79	39.63	46.00	-6.37	Average
7	1.511	22.34	-0.65	10.92	32.61	46.00	-13.39	Average
8	1.577	32.63	-0.66	10.93	42.90	56.00	-13.10	Peak
9	2.500	20.29	-0.67	10.94	30.56	46.00	-15.44	Average
10	13.768	31.01	-0.81	10.91	41.11	60.00	-18.89	Peak
11	23.888	23.88	-1.44	10.88	33.32	50.00	-16.68	Average
12	29.371	24.48	-1.47	10.87	33.88	50.00	-16.12	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	Broadband Digital Transmission System	Product model:	RED bean A
Test by:	Mike	Test mode:	TM 1
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 230 V/50 Hz	Environment:	Temp: 22.5℃ Huni: 55%

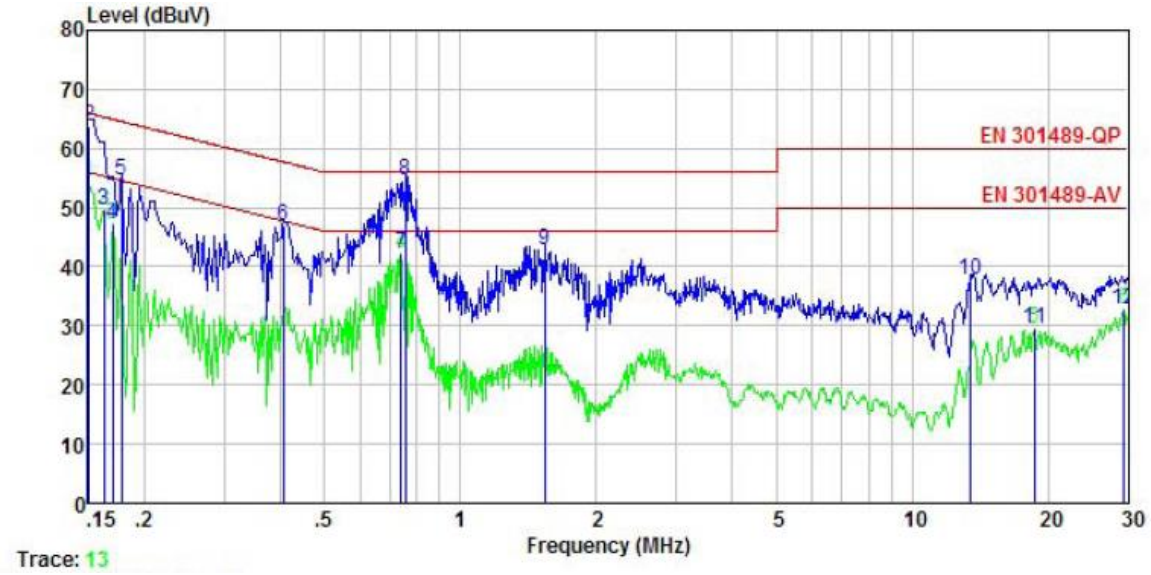


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	52.38	-0.45	10.78	62.71	65.78	-3.07	QP
2	0.154	44.38	-0.45	10.78	54.71	55.78	-1.07	Average
3	0.162	50.64	-0.44	10.77	60.97	65.34	-4.37	QP
4	0.162	39.83	-0.44	10.77	50.16	55.34	-5.18	Average
5	0.170	35.15	-0.43	10.77	45.49	54.94	-9.45	Average
6	0.190	44.35	-0.42	10.76	54.69	64.02	-9.33	QP
7	0.637	27.41	-0.38	10.77	37.80	46.00	-8.20	Average
8	0.724	42.07	-0.38	10.78	52.47	56.00	-3.53	QP
9	0.731	33.33	-0.38	10.78	43.73	46.00	-2.27	Average
10	0.792	42.30	-0.38	10.81	52.73	56.00	-3.27	QP
11	1.527	33.73	-0.40	10.93	44.26	56.00	-11.74	QP
12	29.216	23.18	-1.11	10.87	32.94	50.00	-17.06	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	Broadband Digital Transmission System	Product model:	RED bean C
Test by:	Mike	Test mode:	TM 1
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 230 V/50 Hz	Environment:	Temp: 22.5℃ Huni: 55%

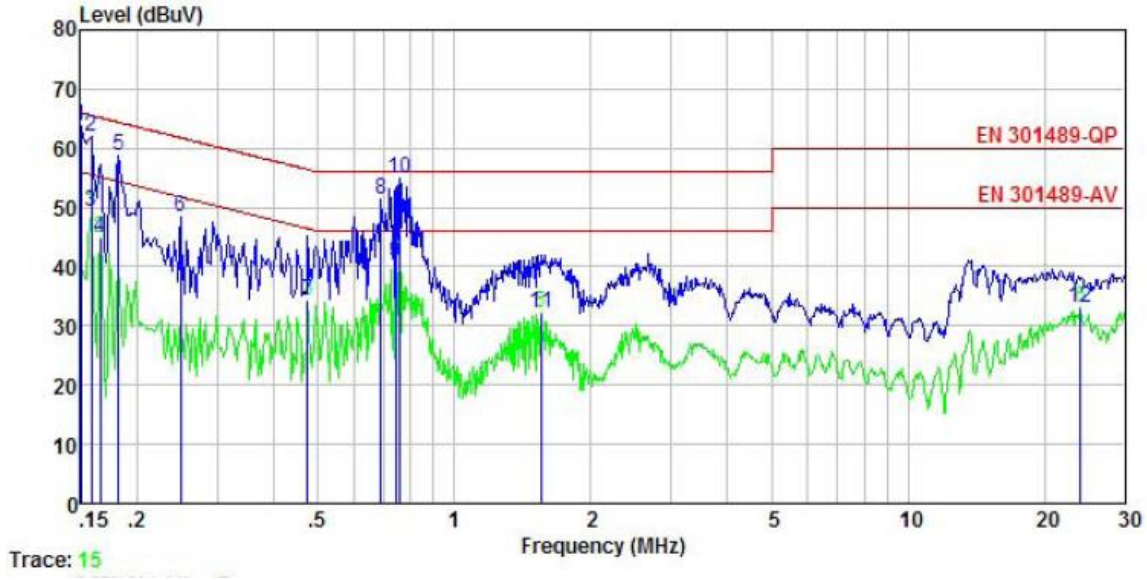


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	44.05	-0.45	10.78	54.38	56.00	-1.62	Average
2	0.151	53.52	-0.45	10.78	63.85	65.96	-2.11	QP
3	0.162	39.25	-0.44	10.77	49.58	55.34	-5.76	Average
4	0.170	36.75	-0.43	10.77	47.09	54.94	-7.85	Average
5	0.178	44.21	-0.43	10.77	54.55	64.59	-10.04	QP
6	0.406	36.67	-0.37	10.72	47.02	57.73	-10.71	QP
7	0.739	31.73	-0.38	10.79	42.14	46.00	-3.86	Average
8	0.755	44.09	-0.38	10.79	54.50	56.00	-1.50	QP
9	1.535	32.21	-0.40	10.93	42.74	56.00	-13.26	QP
10	13.479	27.53	-0.66	10.91	37.78	60.00	-22.22	QP
11	18.622	19.44	-0.90	10.92	29.46	50.00	-20.54	Average
12	29.371	22.92	-1.11	10.87	32.68	50.00	-17.32	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	Broadband Digital Transmission System	Product model:	RED bean C
Test by:	Mike	Test mode:	TM 1
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 230 V/50 Hz	Environment:	Temp: 22.5℃ Huni: 55%



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	53.80	-0.68	10.78	63.90	66.00	-2.10	QP
2	0.158	51.89	-0.68	10.77	61.98	65.56	-3.58	QP
3	0.158	39.10	-0.68	10.77	49.19	55.56	-6.37	Average
4	0.166	34.70	-0.68	10.77	44.79	55.16	-10.37	Average
5	0.182	48.63	-0.69	10.77	58.71	64.42	-5.71	QP
6	0.249	38.46	-0.66	10.75	48.55	61.78	-13.23	QP
7	0.474	24.10	-0.65	10.75	34.20	46.45	-12.25	Average
8	0.690	41.34	-0.64	10.77	51.47	56.00	-4.53	QP
9	0.743	30.49	-0.64	10.79	40.64	46.00	-5.36	Average
10	0.759	44.65	-0.64	10.80	54.81	56.00	-1.19	QP
11	1.552	21.76	-0.66	10.93	32.03	46.00	-13.97	Average
12	24.015	23.69	-1.44	10.88	33.13	50.00	-16.87	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

6.1.3 Harmonics Test Results

Test Requirement:	ETSI EN 301 489-1/17: EN 61000-3-2
Test Method:	N/A: See Remark Below
Remark:	There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN 61000-3-2. For further details, please refer to Clause 7, Note 1 of EN 61000-3-2 which states: "For the following categories of equipment limits are not specified in this edition of the standard. Note 1: Equipment with a rated power of 75W or less, other than lighting equipment."

6.1.4 Flicker Test Results

Test Requirement:	ETSI EN 301 489-1/17: EN 61000-3-3
Test Method:	N/A: See Remark Below
Remark:	1. The appropriate requirements of EN 61000-3-3 [9] for voltage fluctuations and flicker apply for equipment covered by the scope of the present document with an input current up to and including 16A per phase. For equipment with an input current of greater than 16A per phase EN 61000-3-11 [12] applies. 2. As the section 6.1 of EN 61000-3-3, "Devices and Equipment that do(with the utmost probability) not generate relevant voltage fluctuations or flicker need not to be tested".

6.2 EMS (Immunity)

Performance Criteria of ETSI EN 301 489-1/17, sub clause 6

Criteria	Performance Criteria of EN 301 489-1 clause 6
CT/CR	During and after the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.
TT/TR	For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies: • For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. • For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. For all other ports the following applies: • After the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance. • During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed. • If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Criteria	Performance Criteria of EN 301 489-17 clause 6
CT	The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.
TT	The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.
CR	The performance criteria A shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.
TR	The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Table 1: Performance criteria

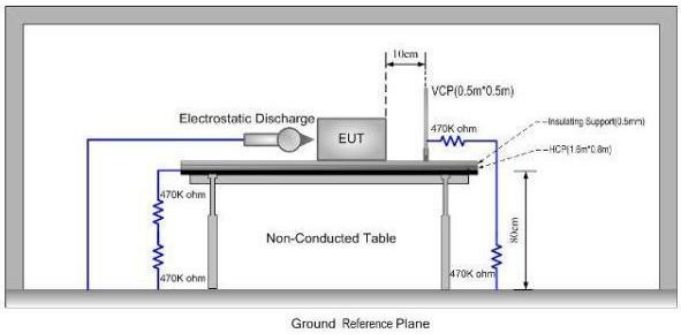
Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

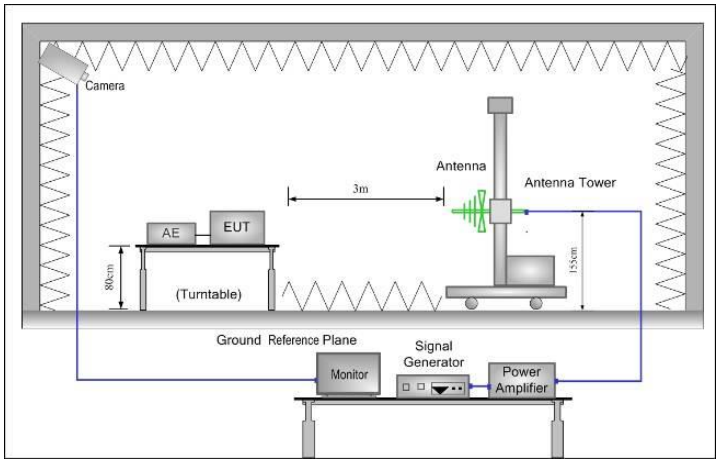
6.2.1 Electrostatic Discharge

Test Requirement:	ETSI EN 301 489-1					
Test Method:	EN 61000-4-2					
Discharge Voltage:	Contact Discharge, HCP and VCP: ±2kV, ±4kV, Air Discharge: ±2kV, ±4kV, ±8kV					
Polarity:	Positive & Negative					
Number of Discharge:	Contact Discharge: Minimum 25 times at each test point, Air Discharge: Minimum 10 times at each test point.					
Discharge Mode:	Single Discharge					
Discharge Period:	1 second minimum					
Testsetup:						
Test Procedure:	**1) Air discharge:** The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure was repeated until all the air discharge completed **2) Contact discharge:** The test was applied on conductive surfaces of EUT. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. **3) Indirect discharge for horizontal coupling plane** At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.Consideration should be given to exposing all sides of the EUT. **4) Indirect discharge for vertical coupling plane** At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.					
Test environment:	Temp.:	26°C	Humid.:	54%	Press.:	101kPa
Test Instruments:	Refer to section 5.10 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Passed					

Measurement Record:

Test points:	I: N/A			
	II: N/A			
Direct discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observations (Performance Criterion)**	**Result**
± 2,± 4	Contact	N/A	TT/TR	N/A
± 2,± 4,± 8	Air	N/A	TT/TR	N/A
Indirect discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observation Performance**	**Result**
± 2,± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	TT/TR	Pass
± 2,± 4	VCP-Front/Back /Left/Right	Center of the VCP	TT/TR	Pass

6.2.2 Radiated Immunity

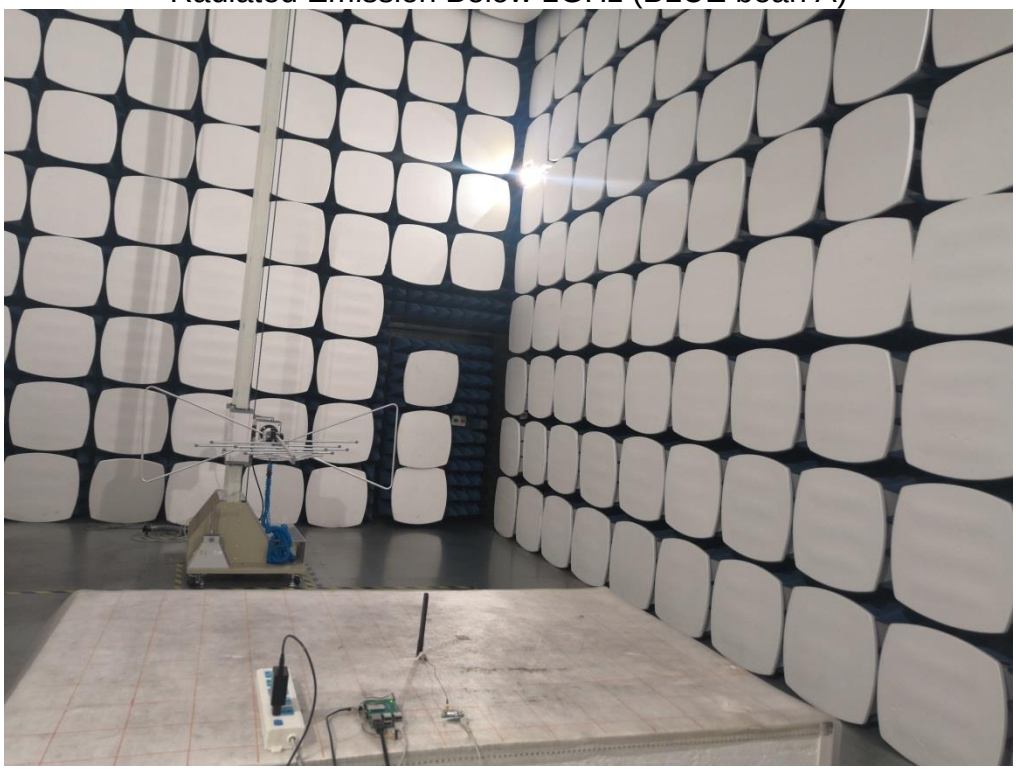
Test Requirement:	ETSI EN 301 489 -1					
Test Method:	EN 61000-4-3					
Frequency range:	80MHz to 6GHz					
Test Level:	3V/m					
Modulation:	80%, 1kHz Amplitude Modulation					
Testsetup:						
Test Procedure:	1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary.Where the frequency range was swept incrementally, the step size was not exceed 1 % of thepreceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing each side of the EUT. 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.					
Test environment:	Temp.:	26°C	Humid.:	54%	Press.:	101kPa
Test Instruments:	Refer to section 5.10 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Passed					

Measurement Record:

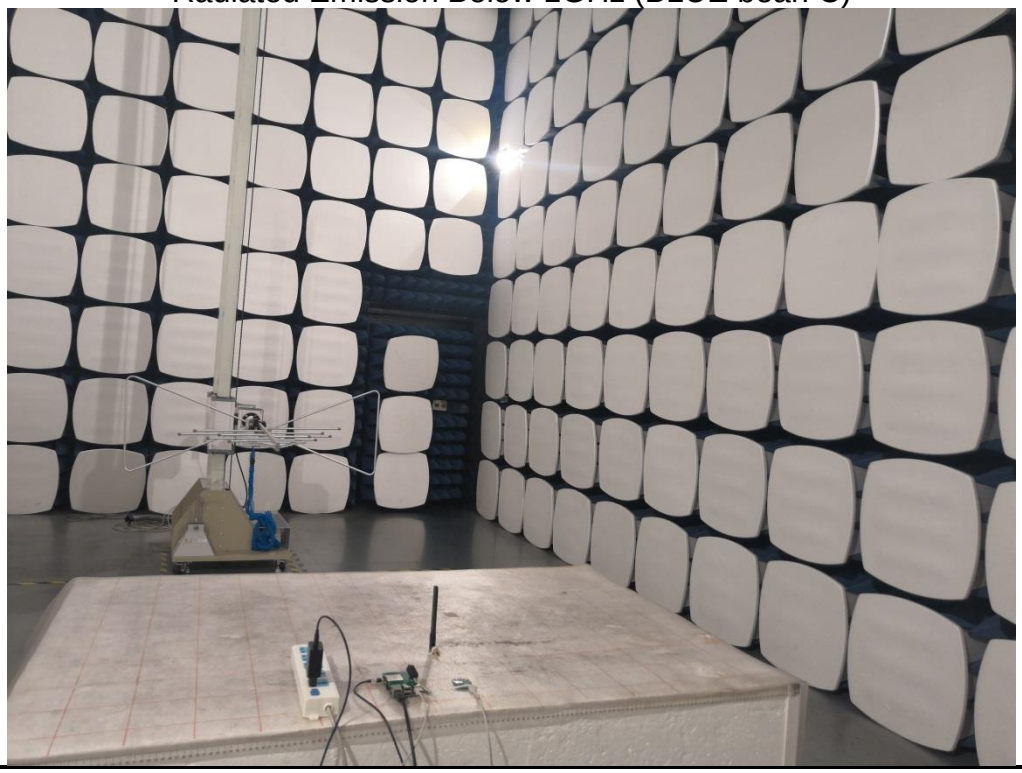
Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)	Result
80MHz-6GHz	3V/m	1kHz, 80% Amp. Mod, 1% increment, dwell time=3seconds	V	Front	CT/CR	Pass
			H			
			V	Rear		
			H			
			V	Left		
			H			
			V	Right		
			H			
			V	Top		
			H			
			V	Bottom		
			H			

7 Test Setup Photo

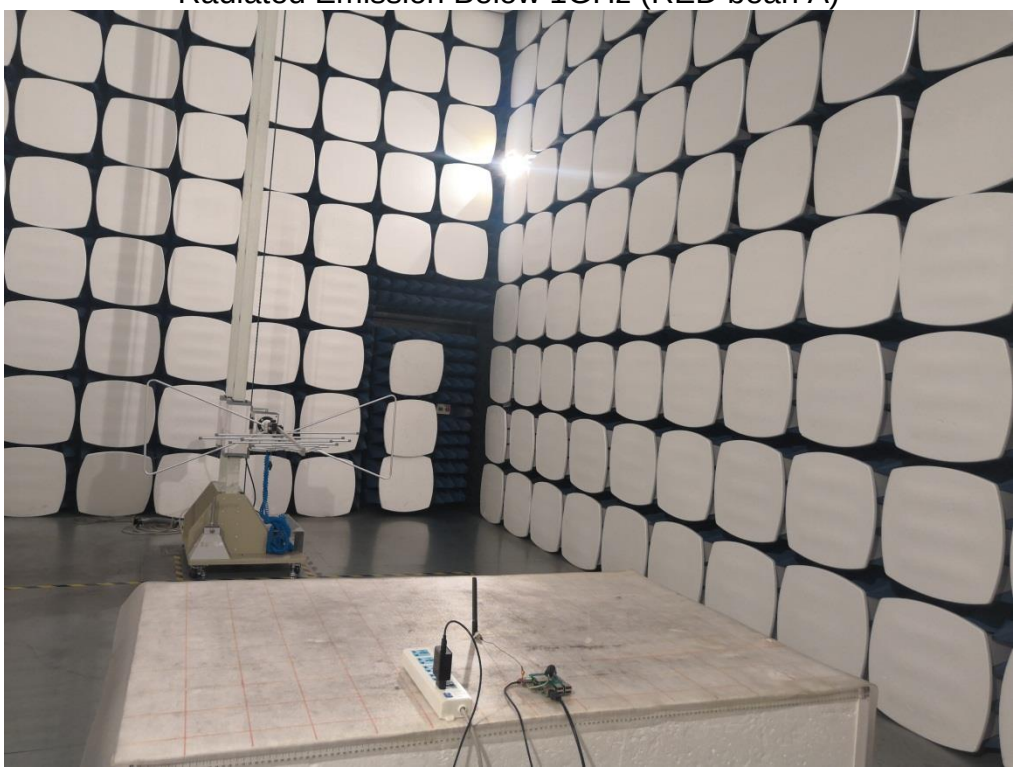
Radiated Emission Below 1GHz (BLUE bean A)



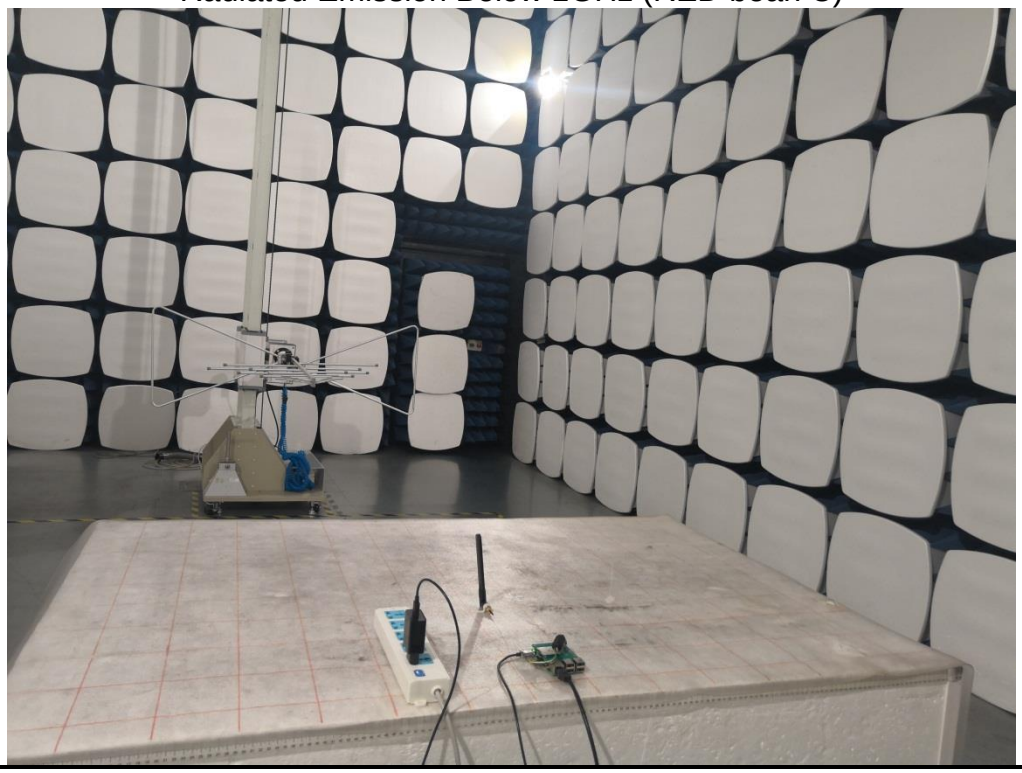
Radiated Emission Below 1GHz (BLUE bean C)



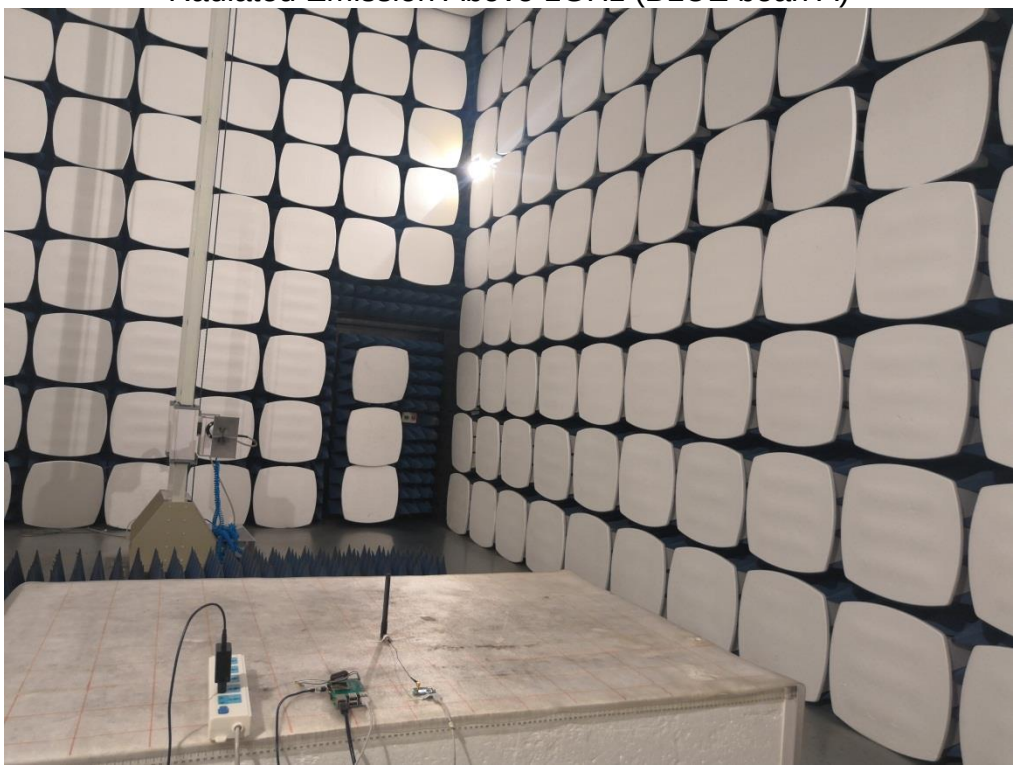
Radiated Emission Below 1GHz (RED bean A)



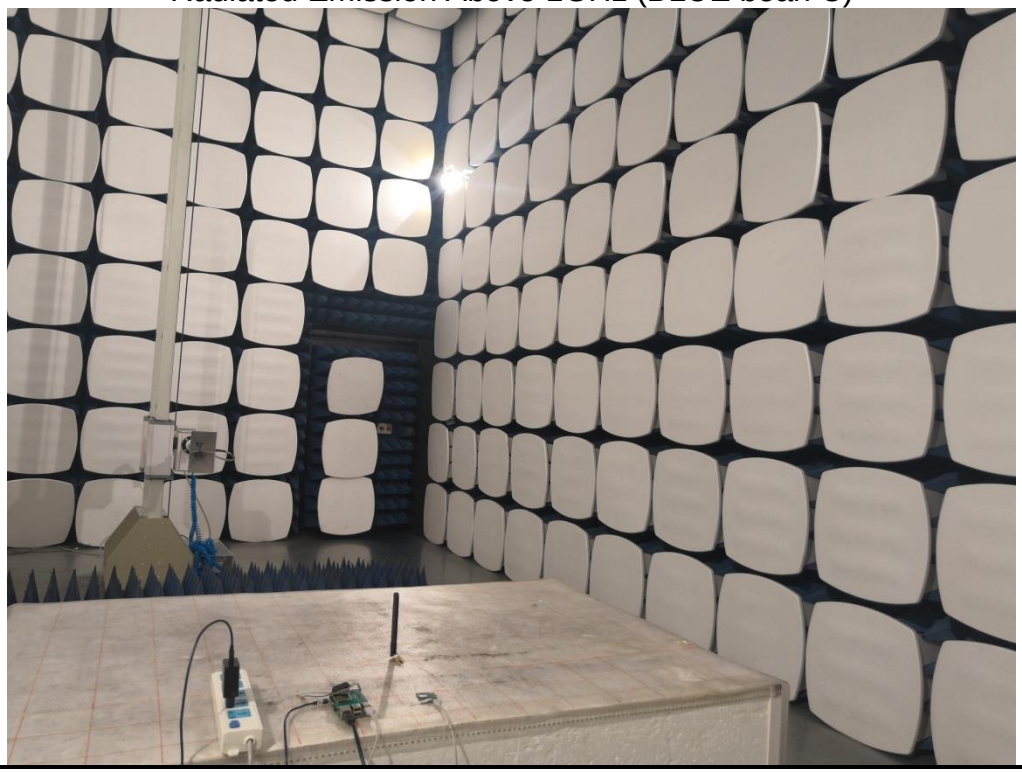
Radiated Emission Below 1GHz (RED bean C)



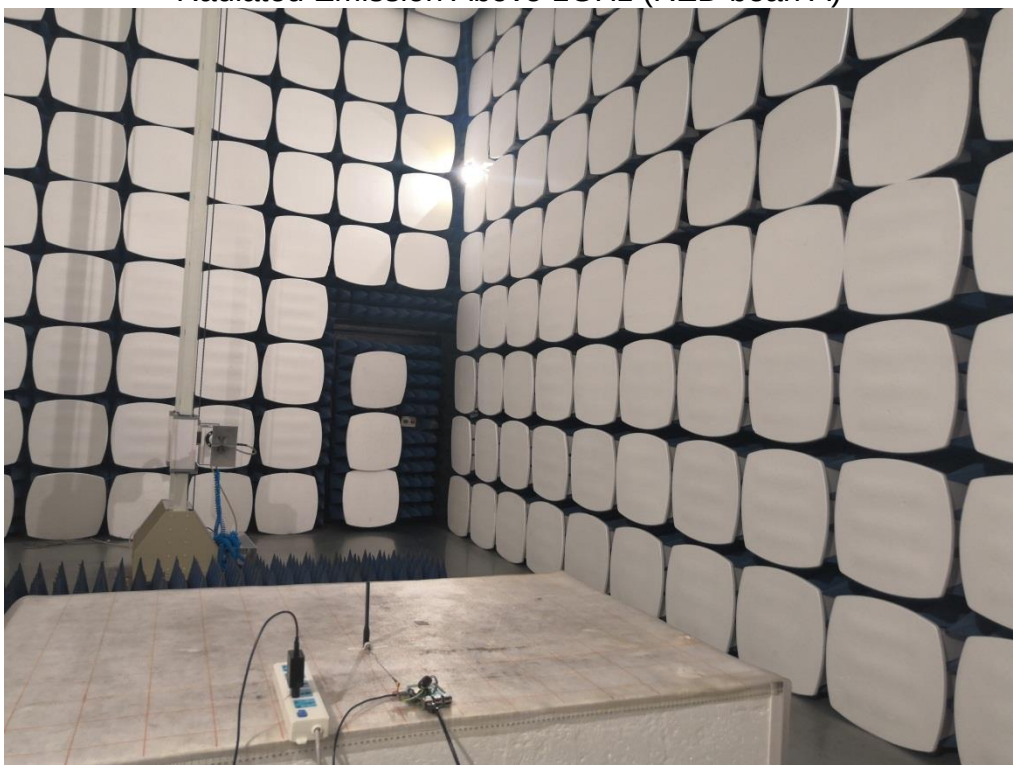
Radiated Emission Above 1GHz (BLUE bean A)



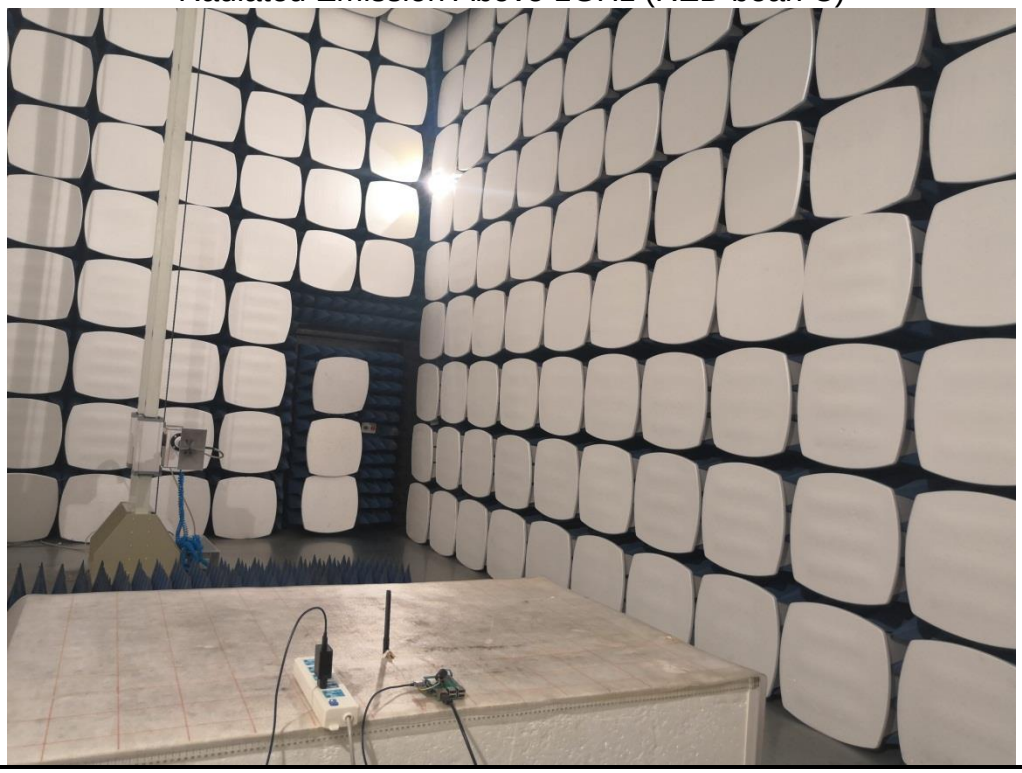
Radiated Emission Above 1GHz (BLUE bean C)



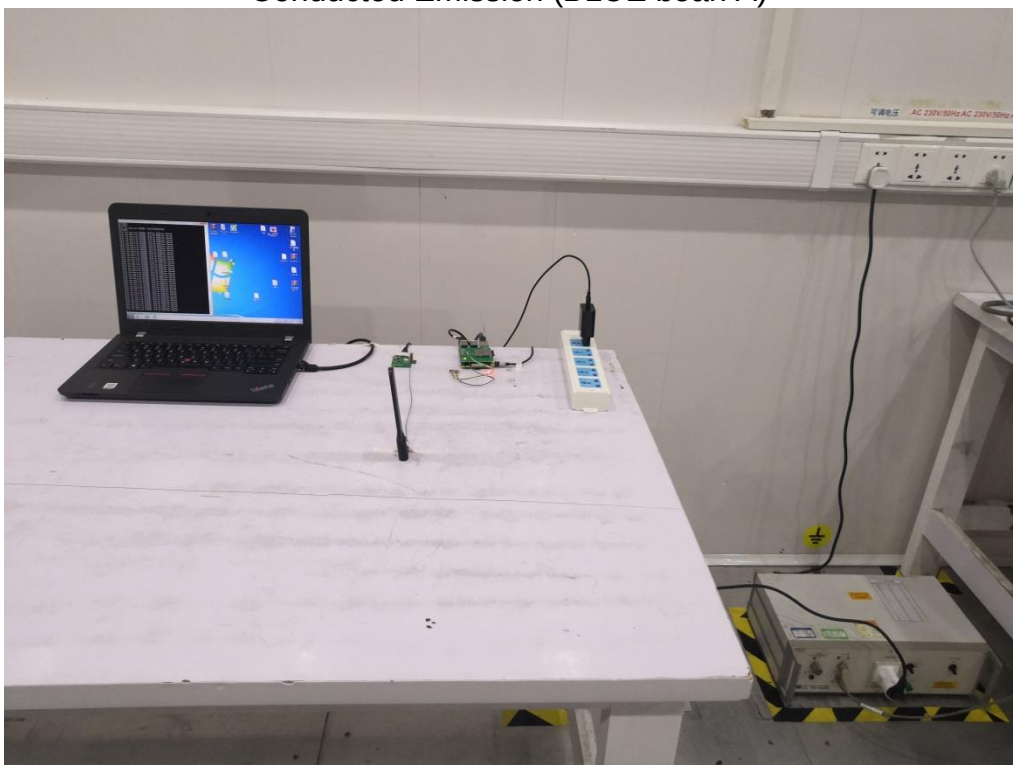
Radiated Emission Above 1GHz (RED bean A)



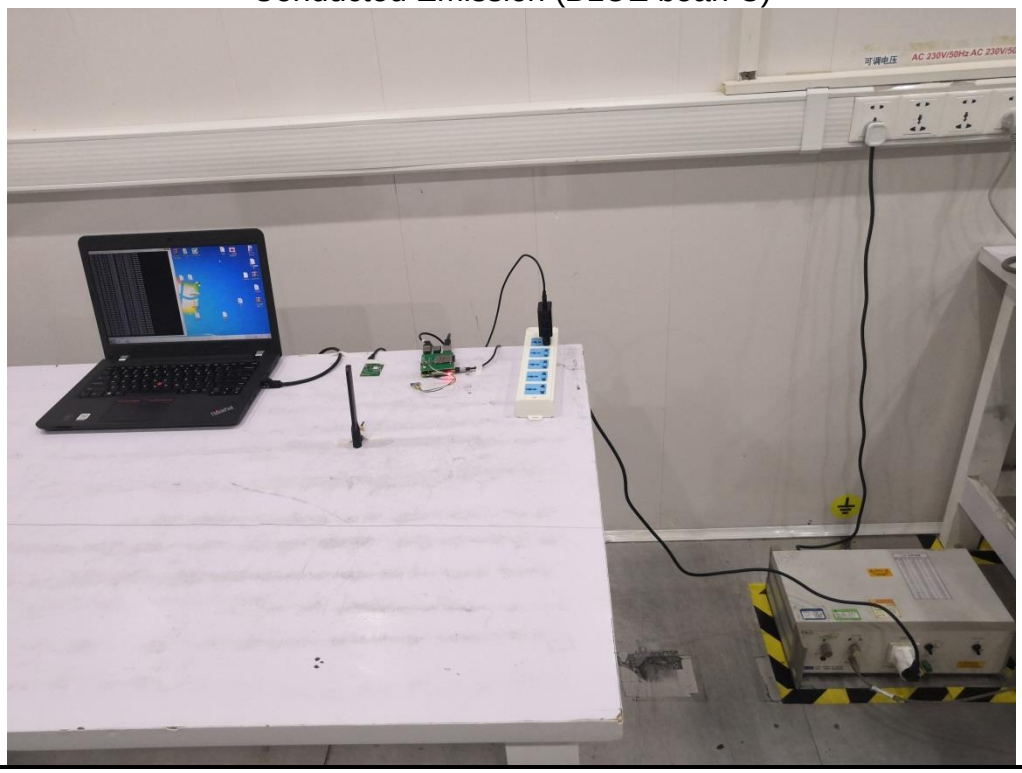
Radiated Emission Above 1GHz (RED bean C)



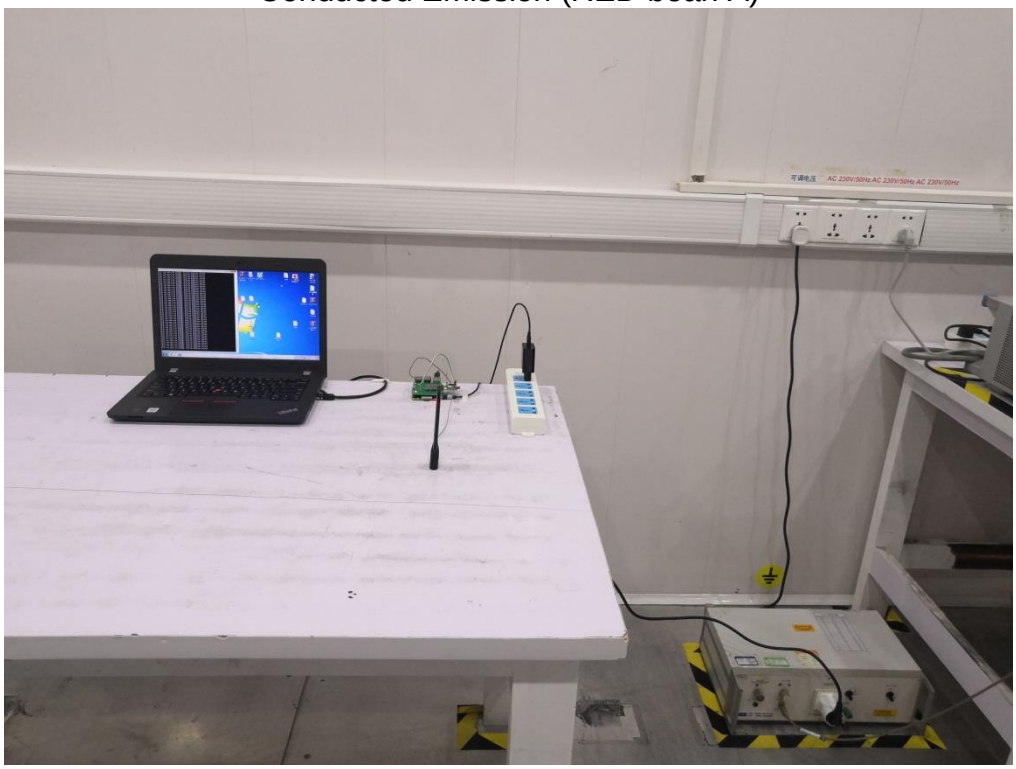
Conducted Emission (BLUE bean A)



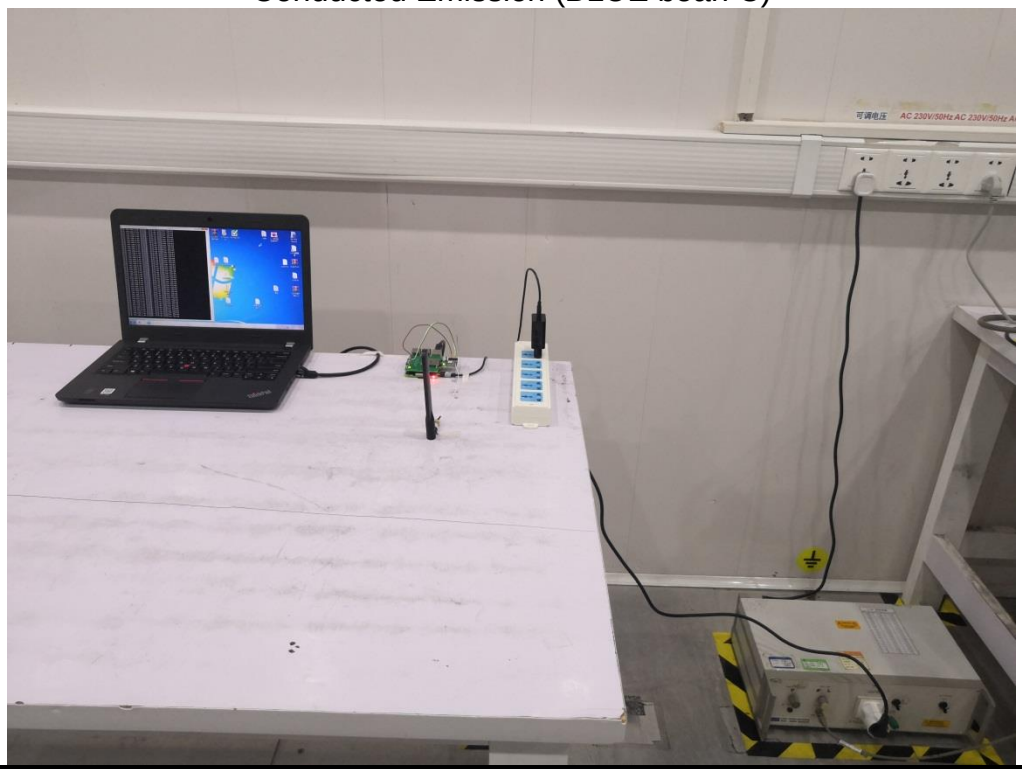
Conducted Emission (BLUE bean C)



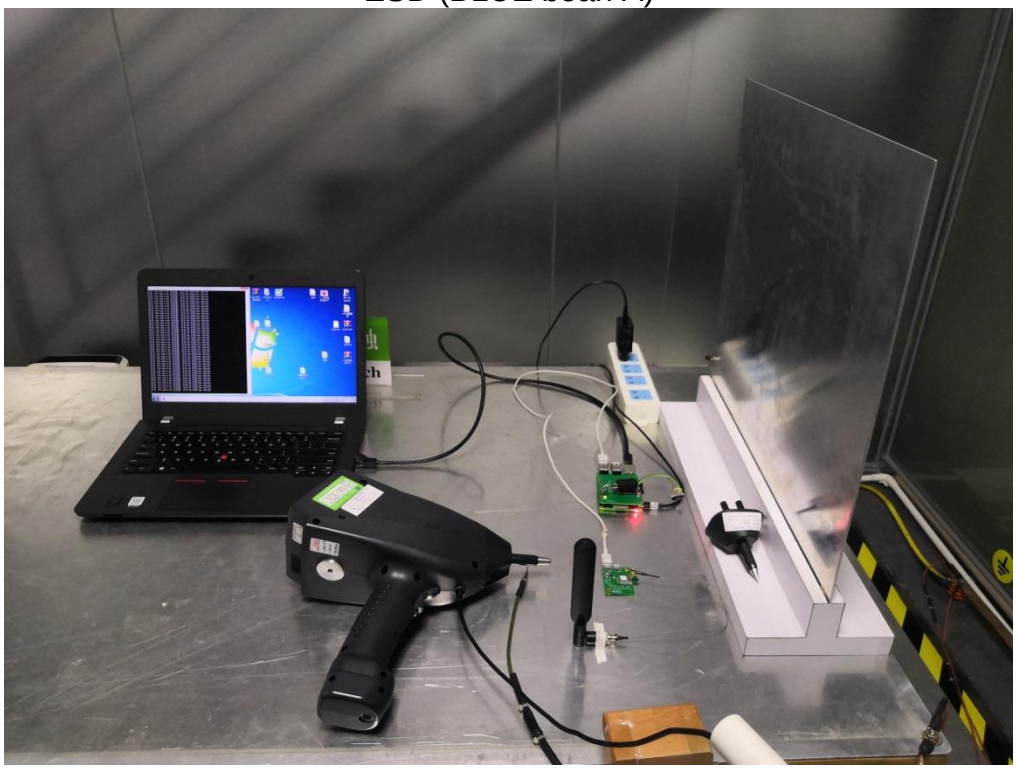
Conducted Emission (RED bean A)



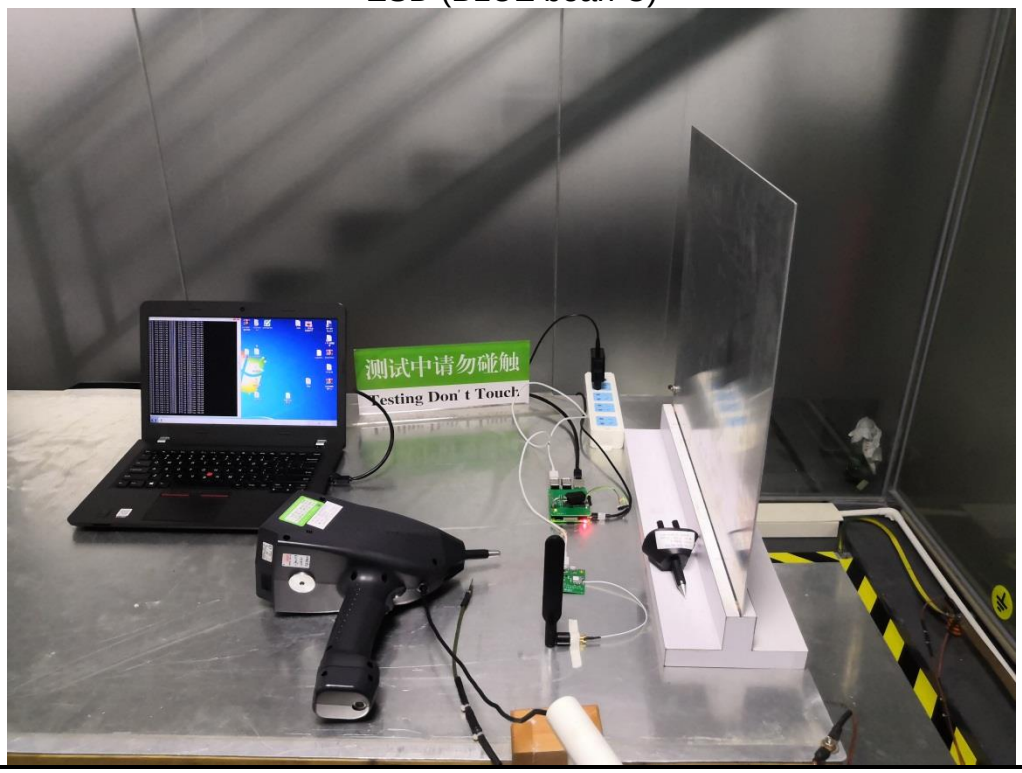
Conducted Emission (BLUE bean C)



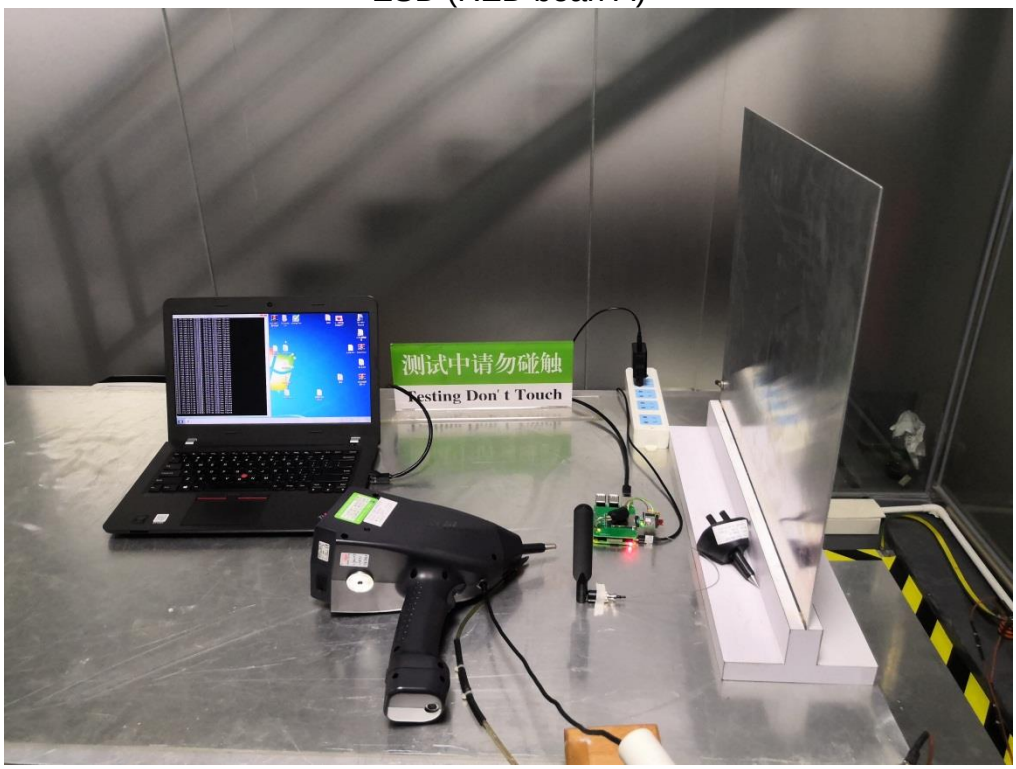
ESD (BLUE bean A)



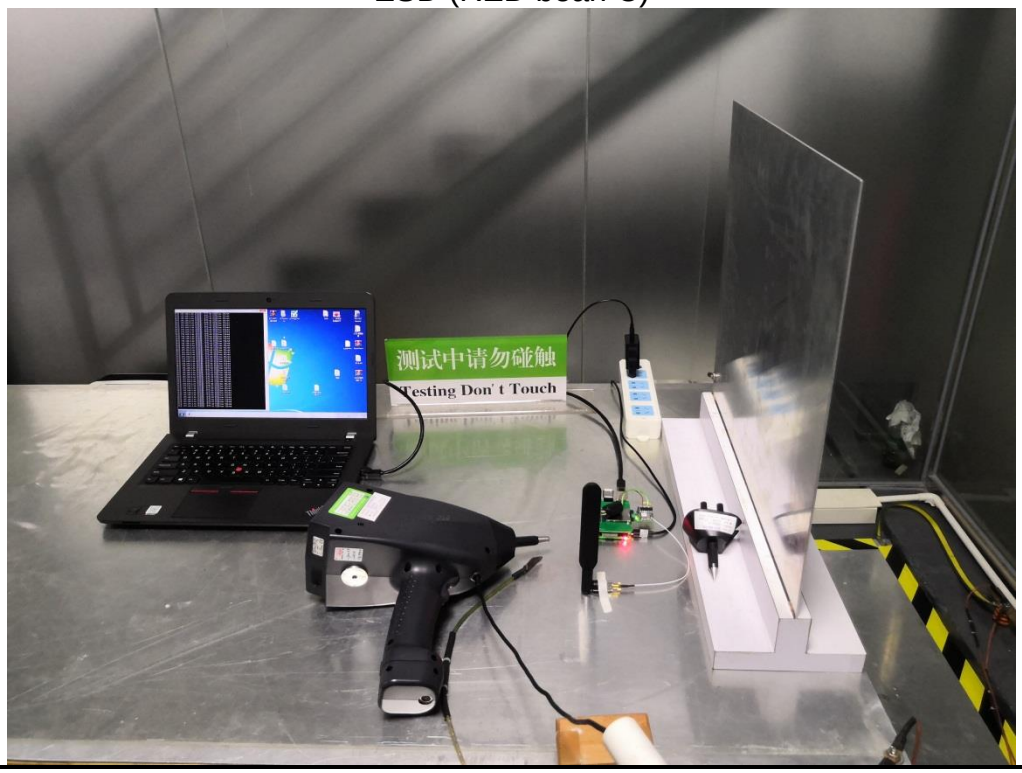
ESD (BLUE bean C)



ESD (RED bean A)

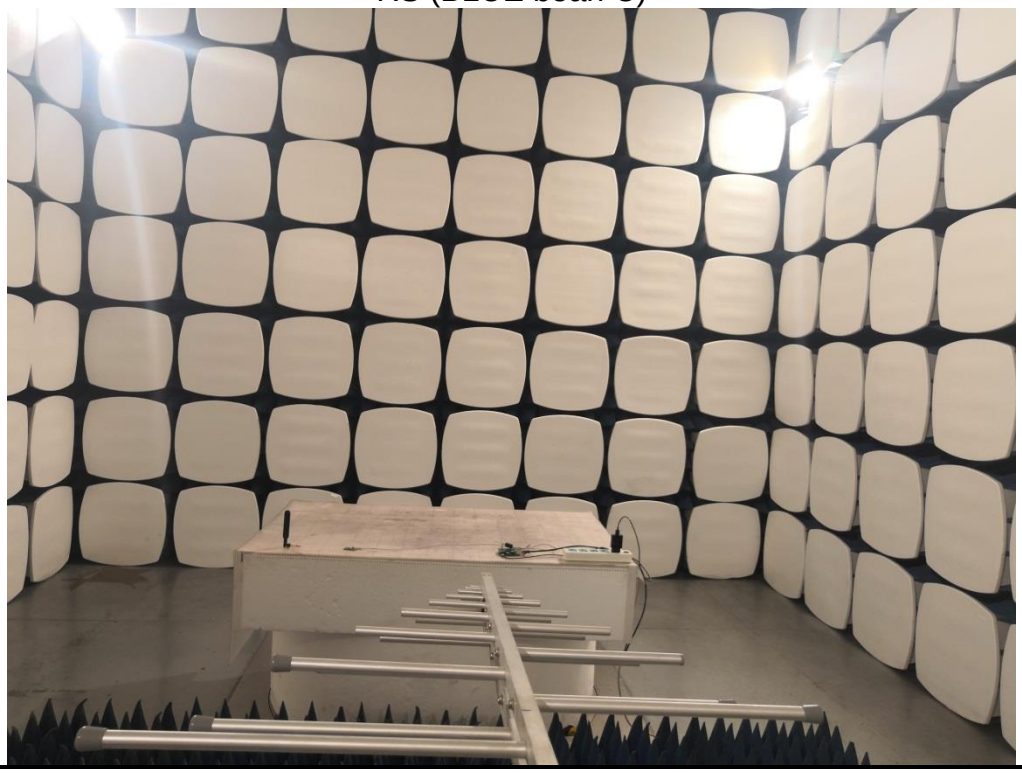


ESD (RED bean C)

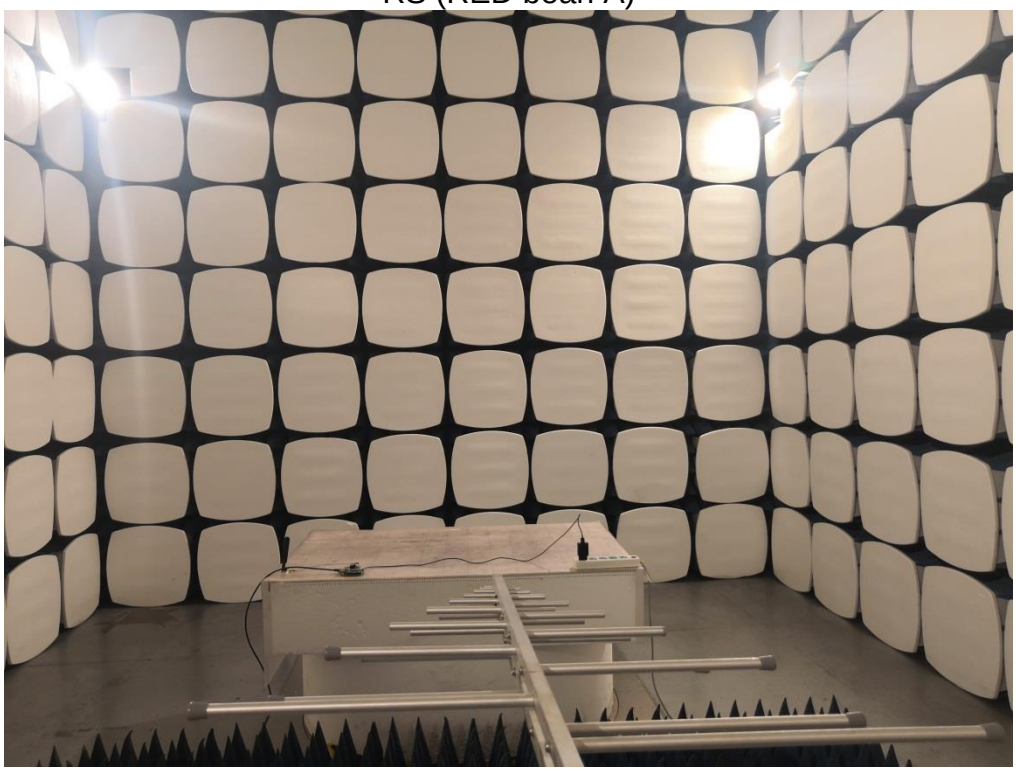


RS (BLUE bean A)

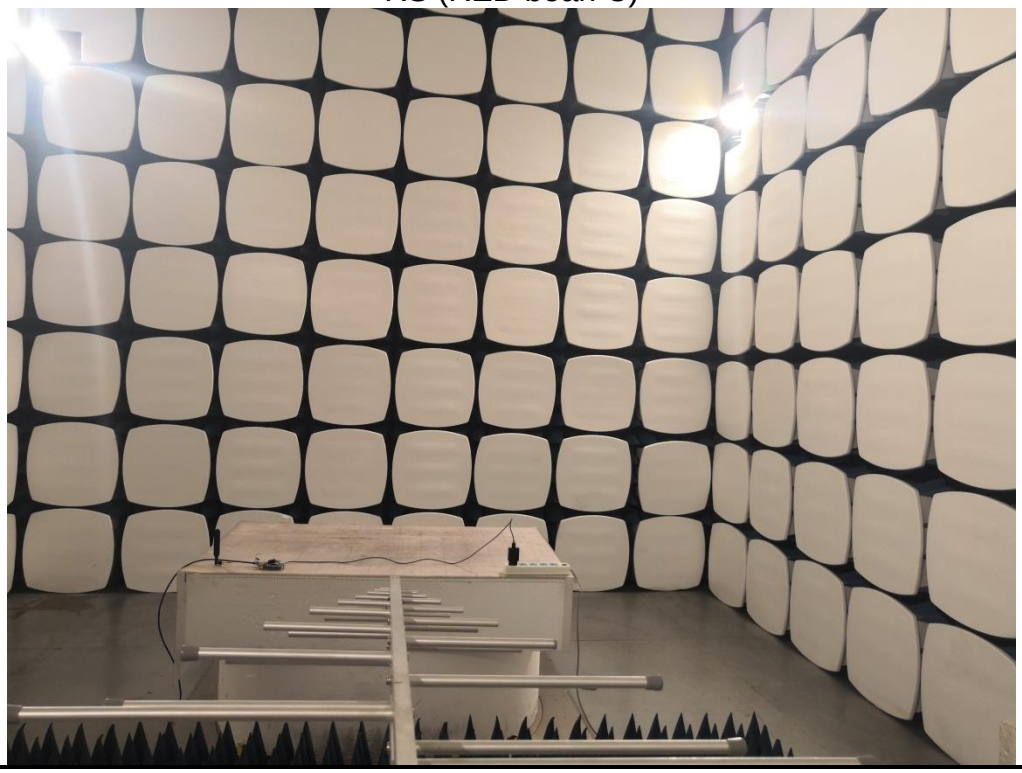
RS (BLUE bean C)



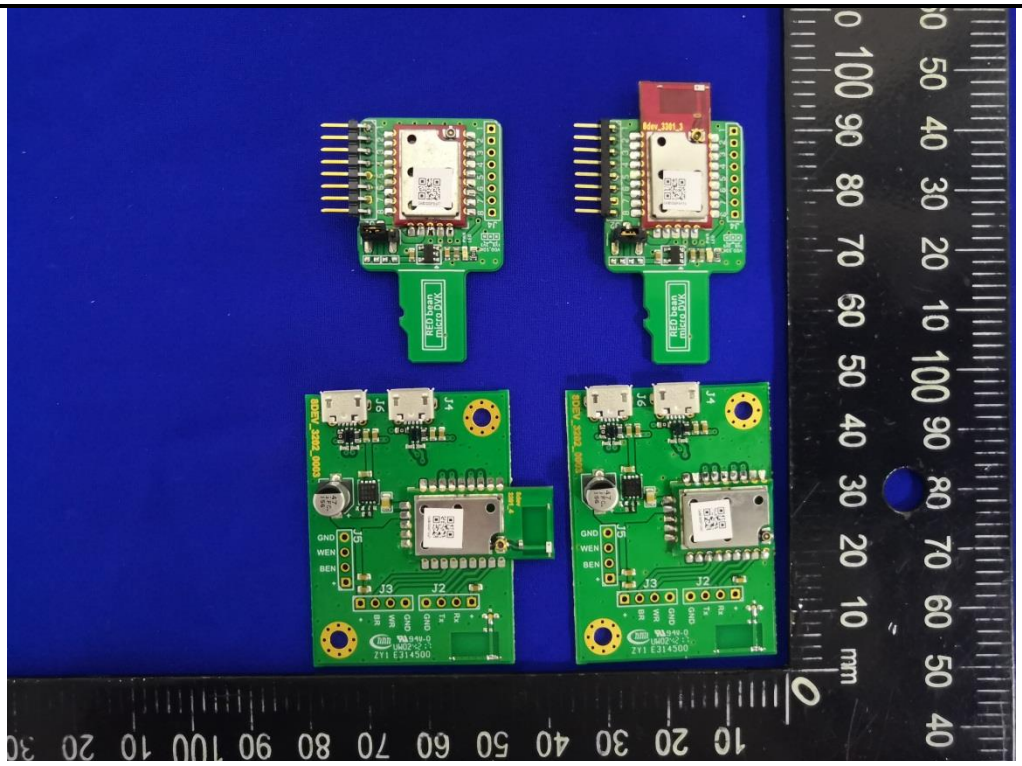
RS (RED bean A)

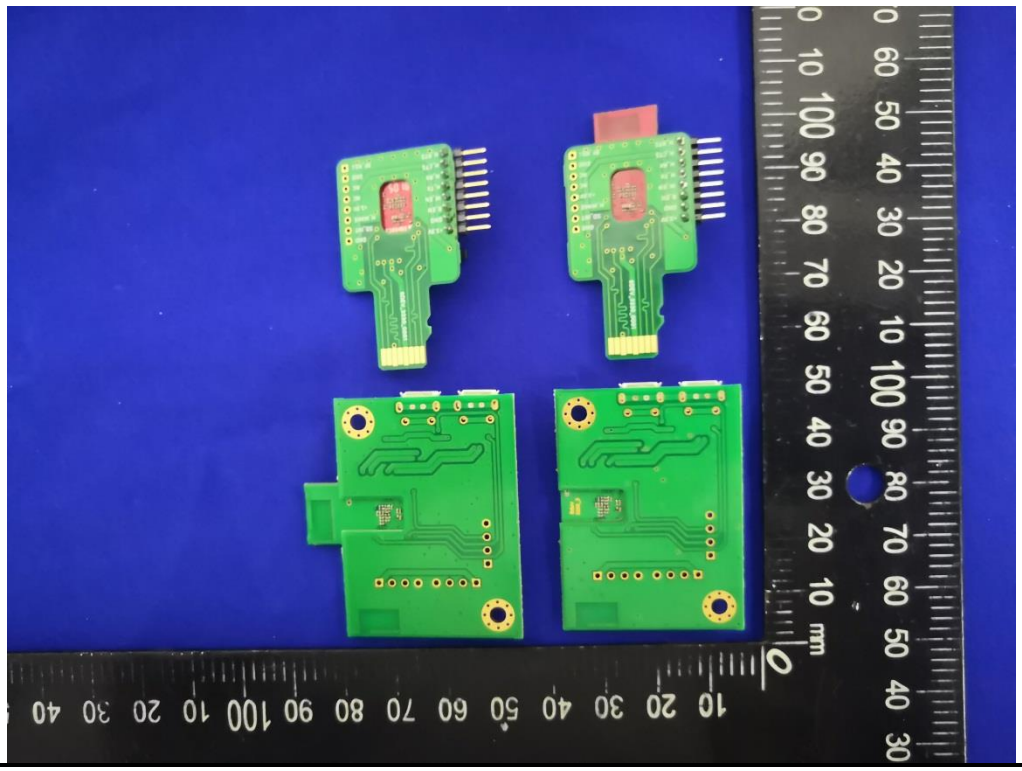


RS (RED bean C)

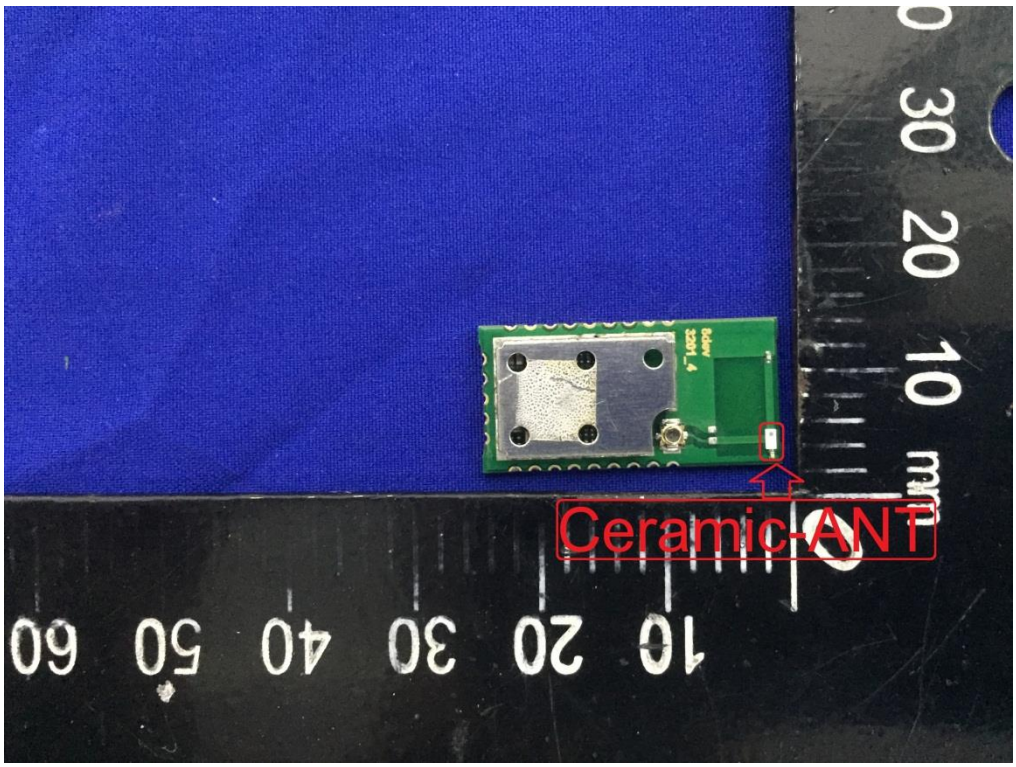


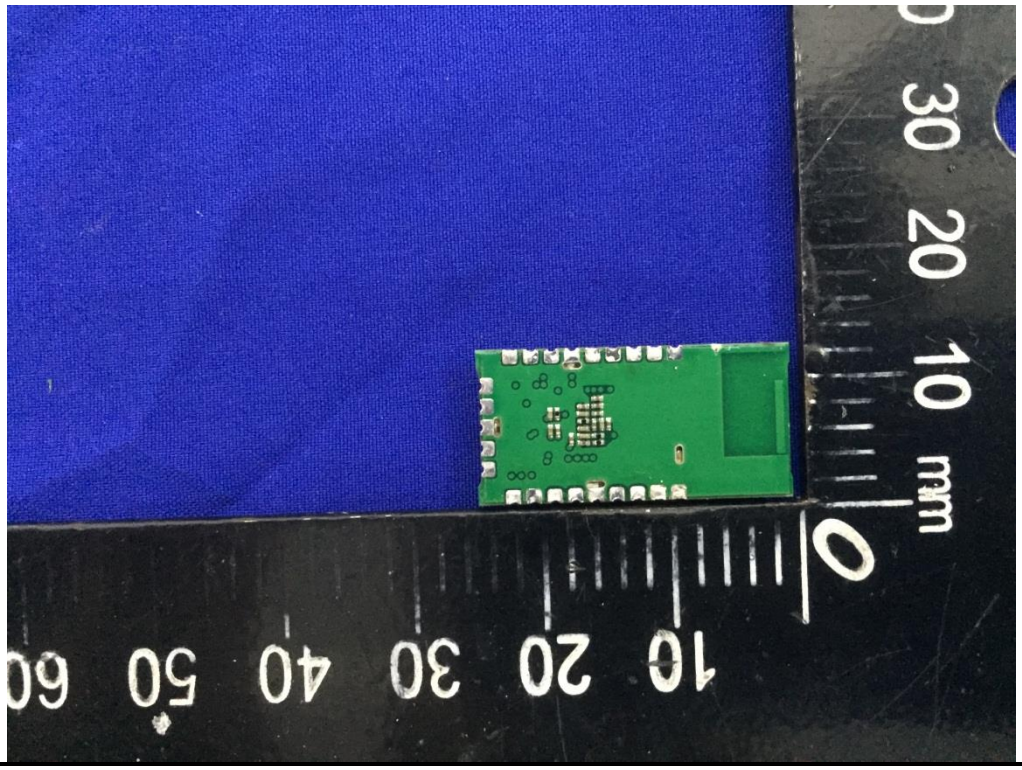
8 EUT Constructional Details

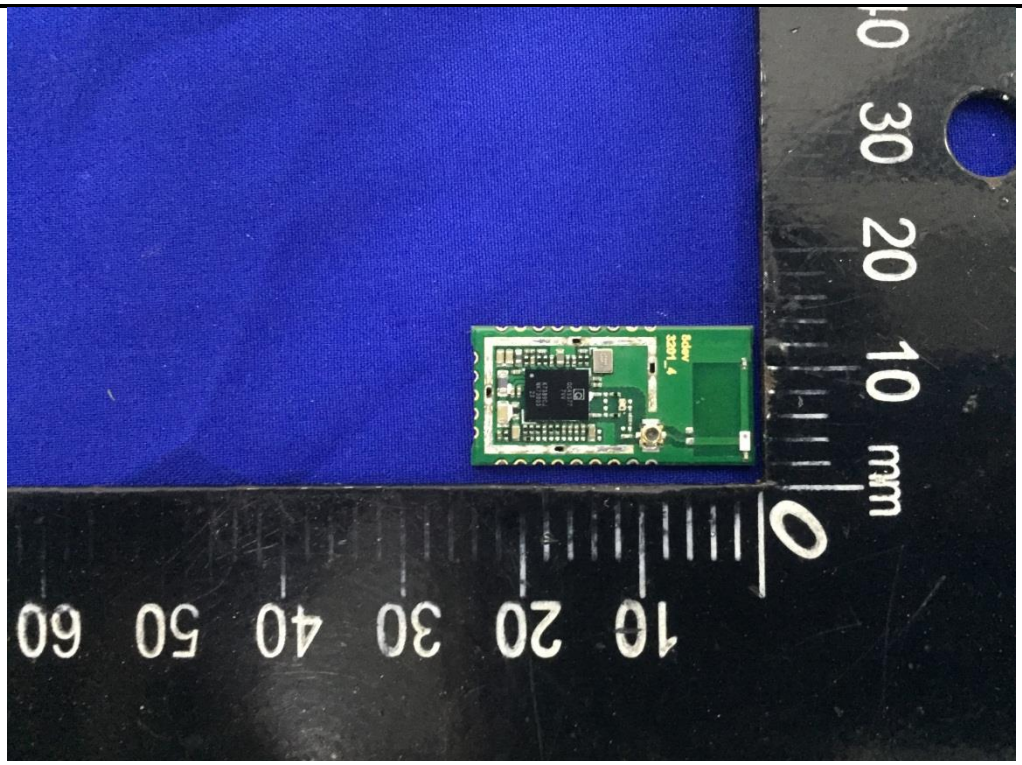




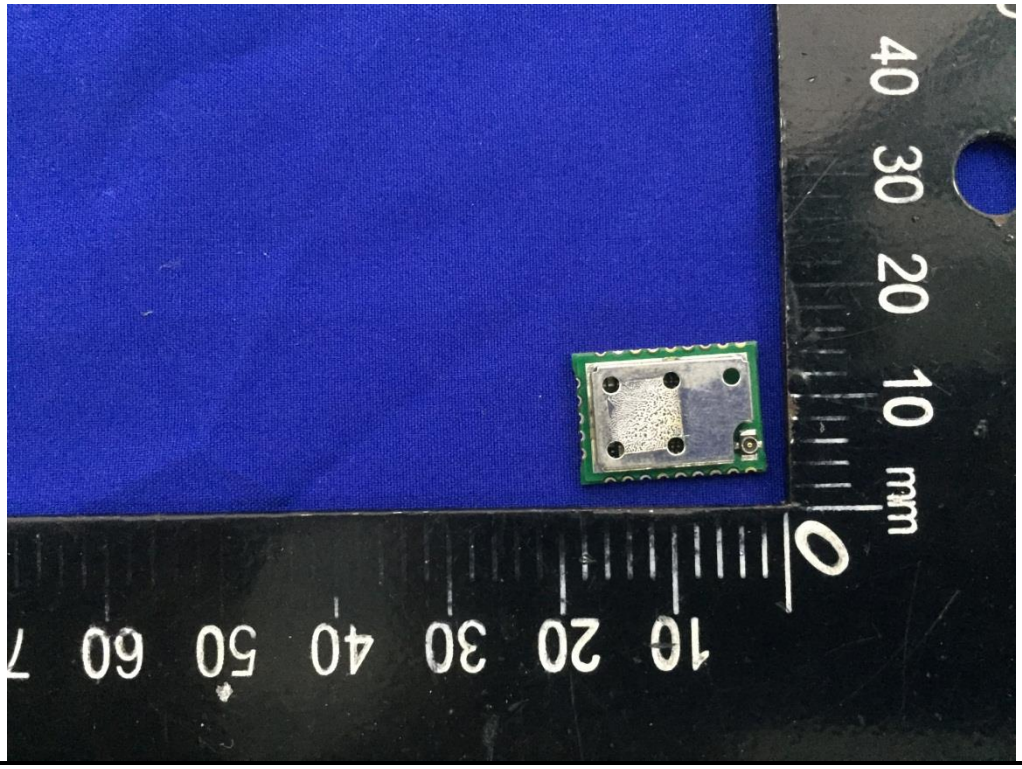
BLUE bean A

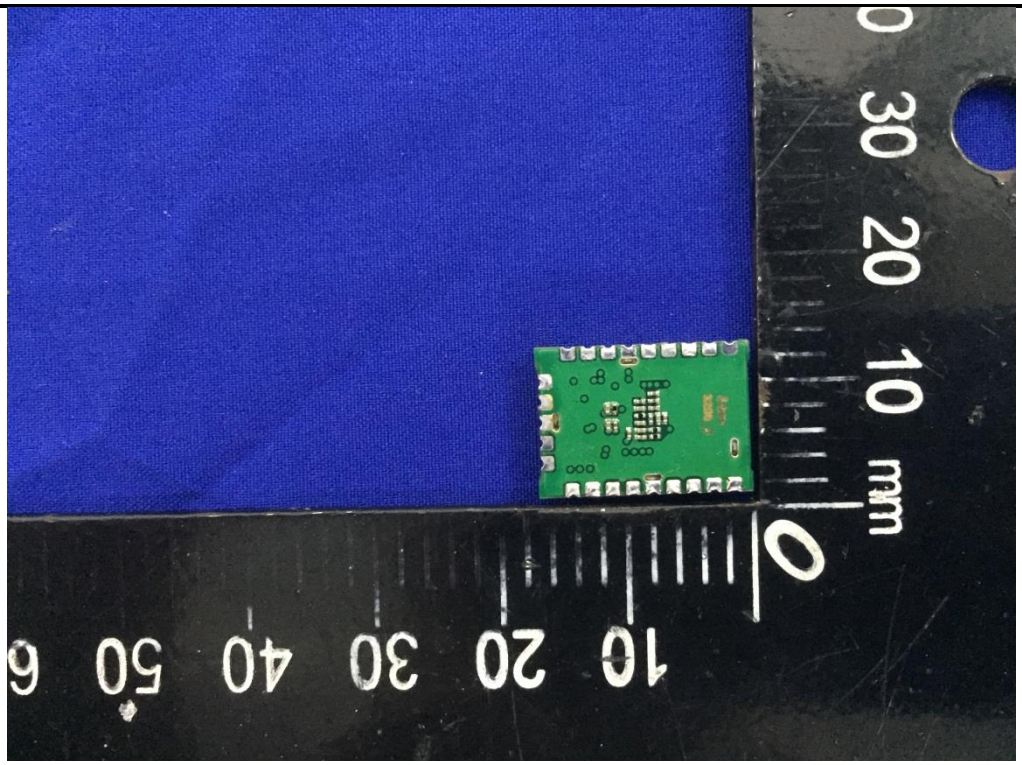






BLUE bean C

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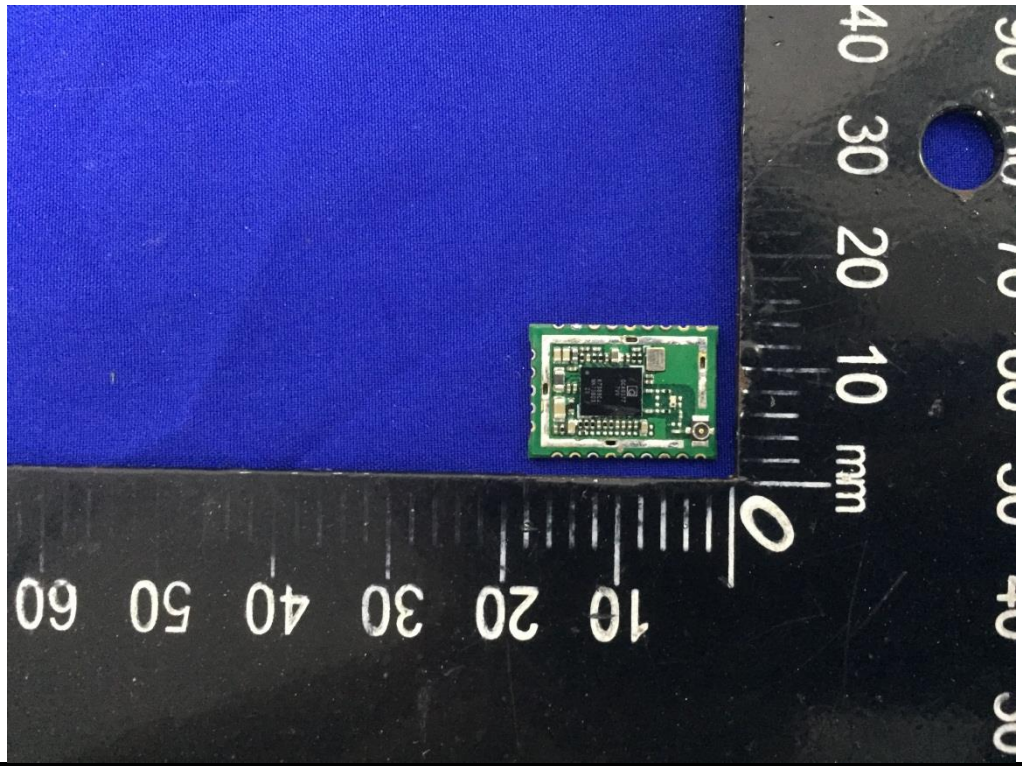
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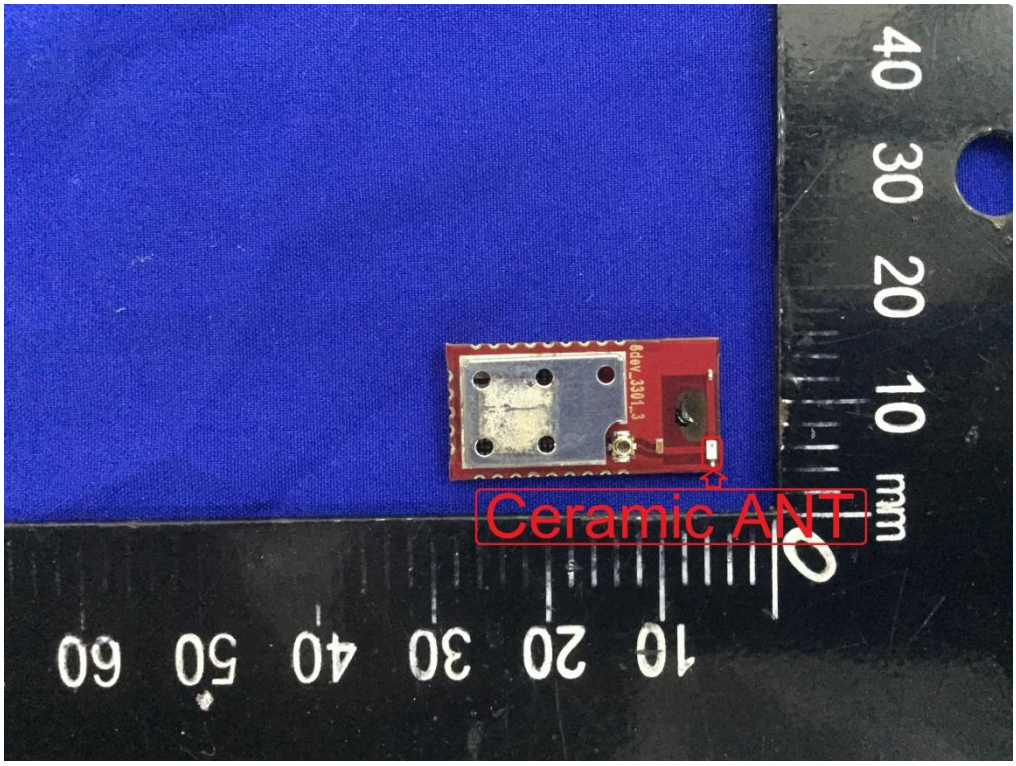
RED bean A


Ceramic ANT
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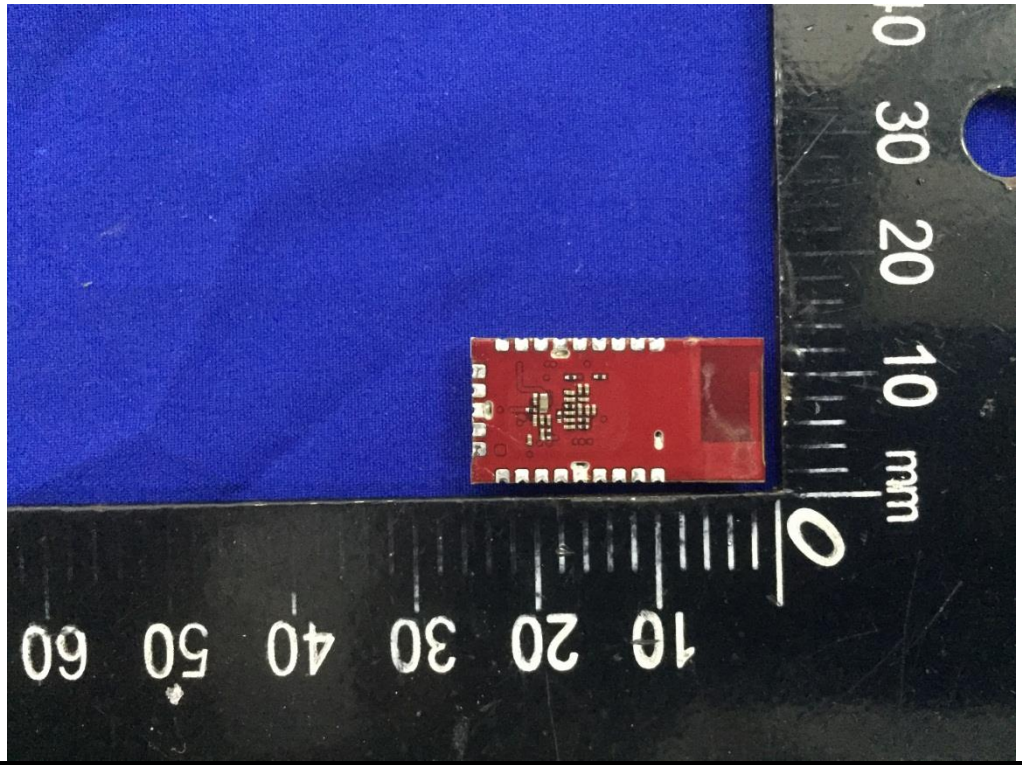
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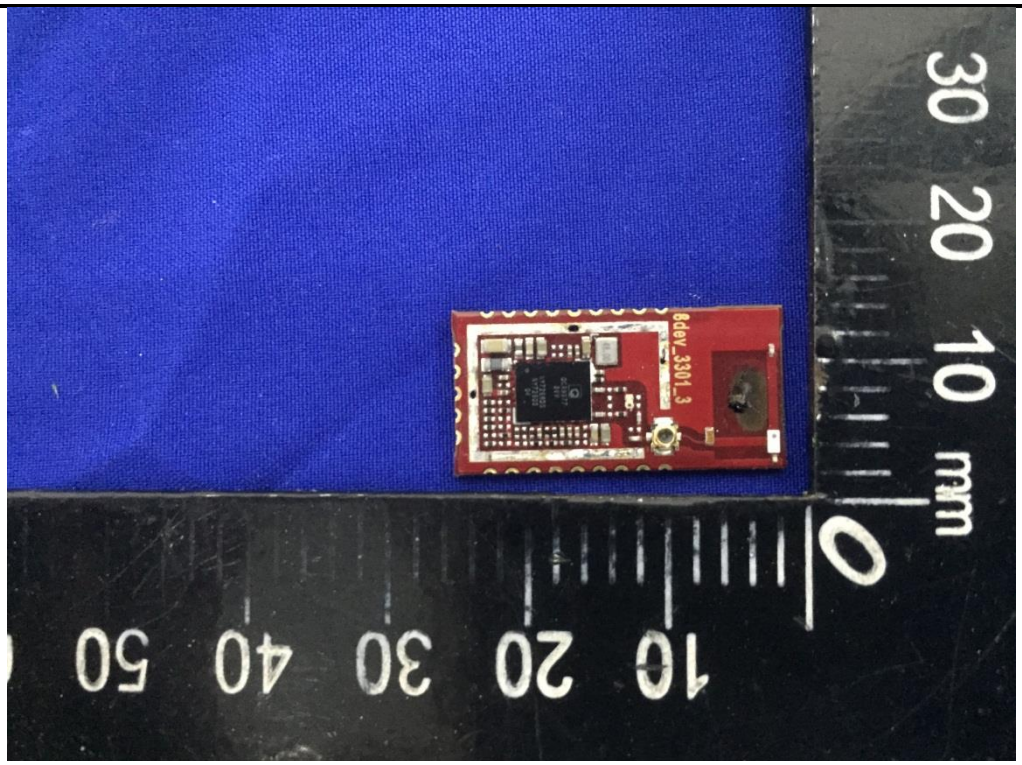
6dev_3301_3
30 20 10 mm 0
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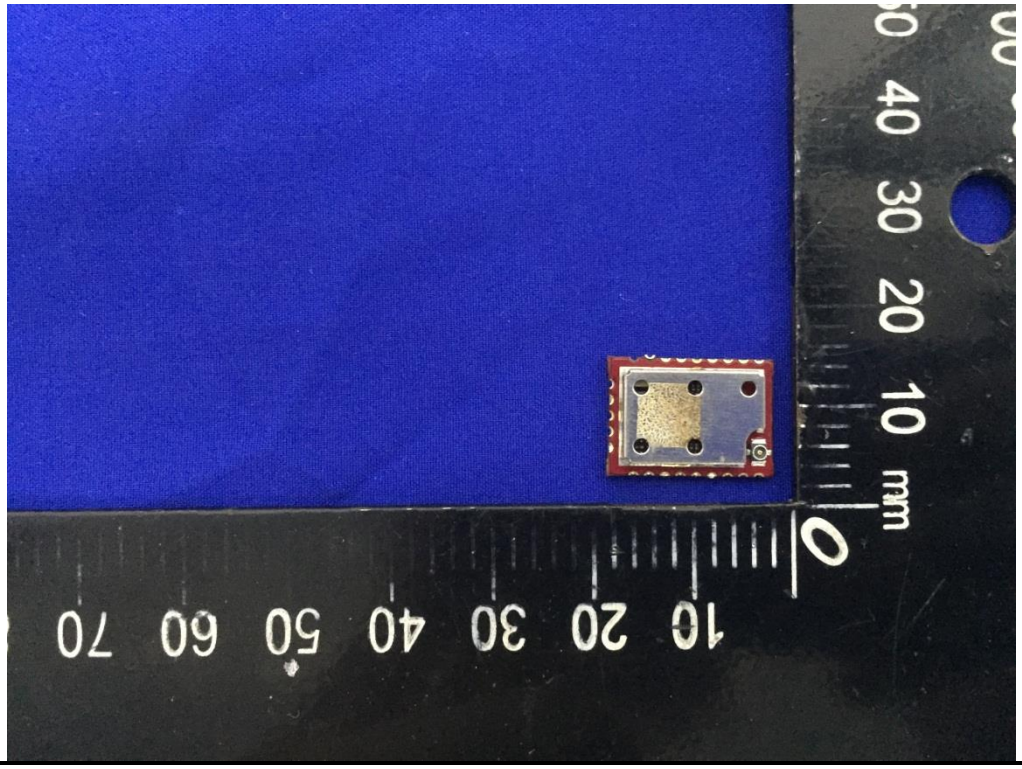
RED bean C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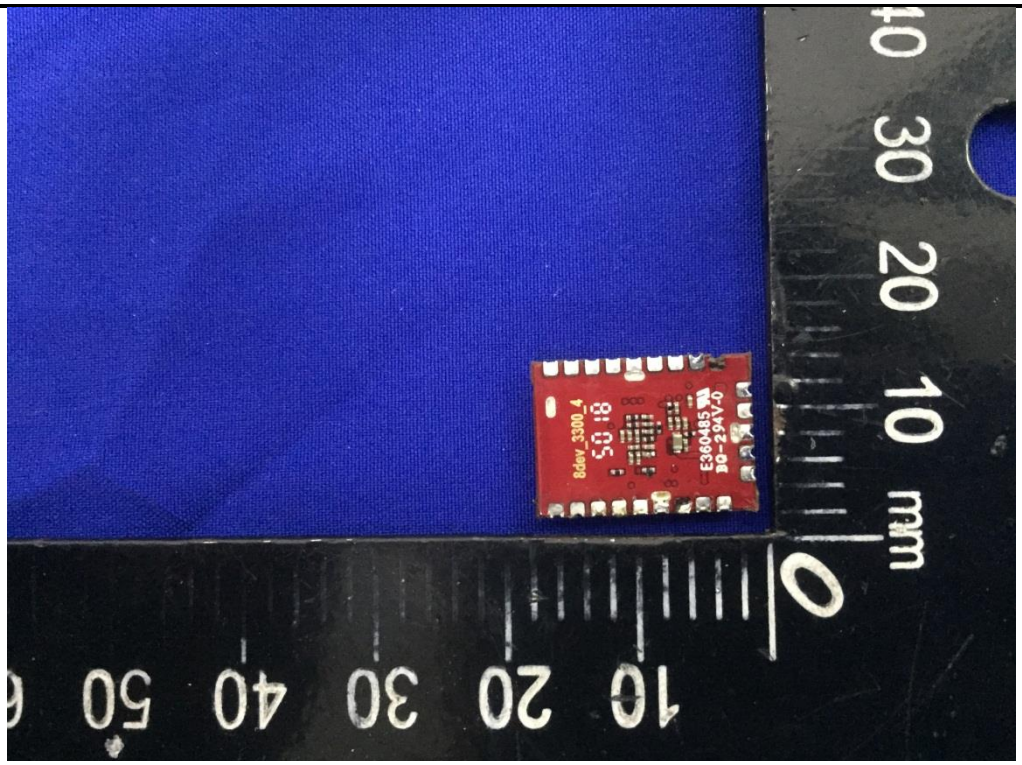
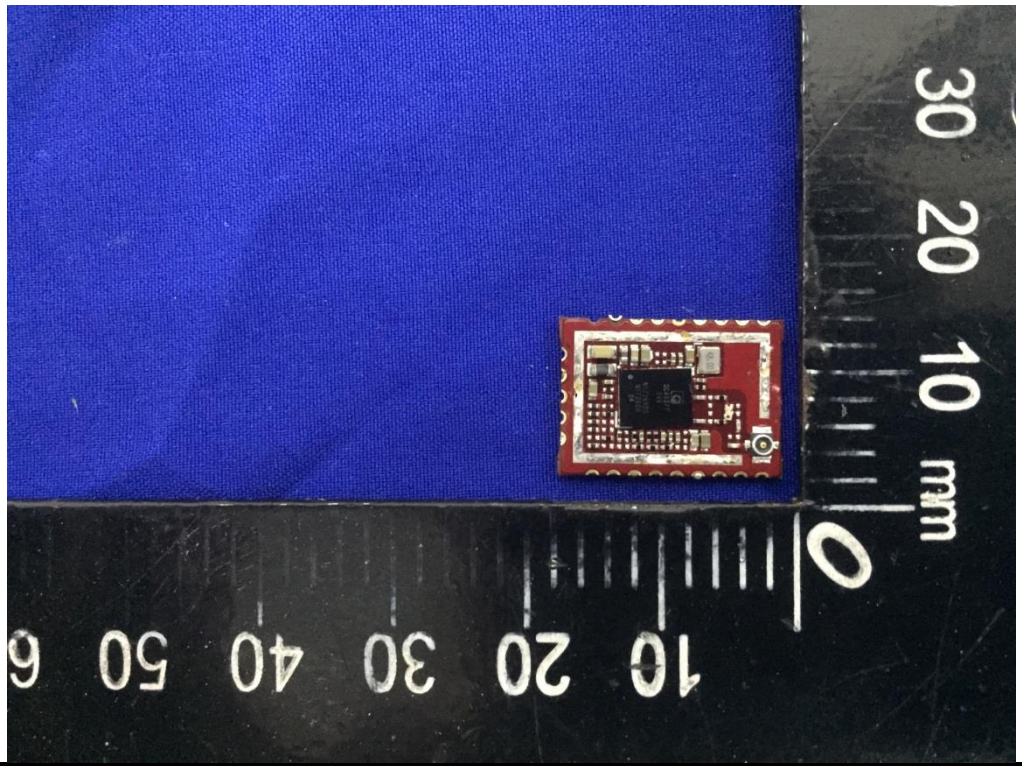

mm
0
10
20
30
40
50
60


mm
0
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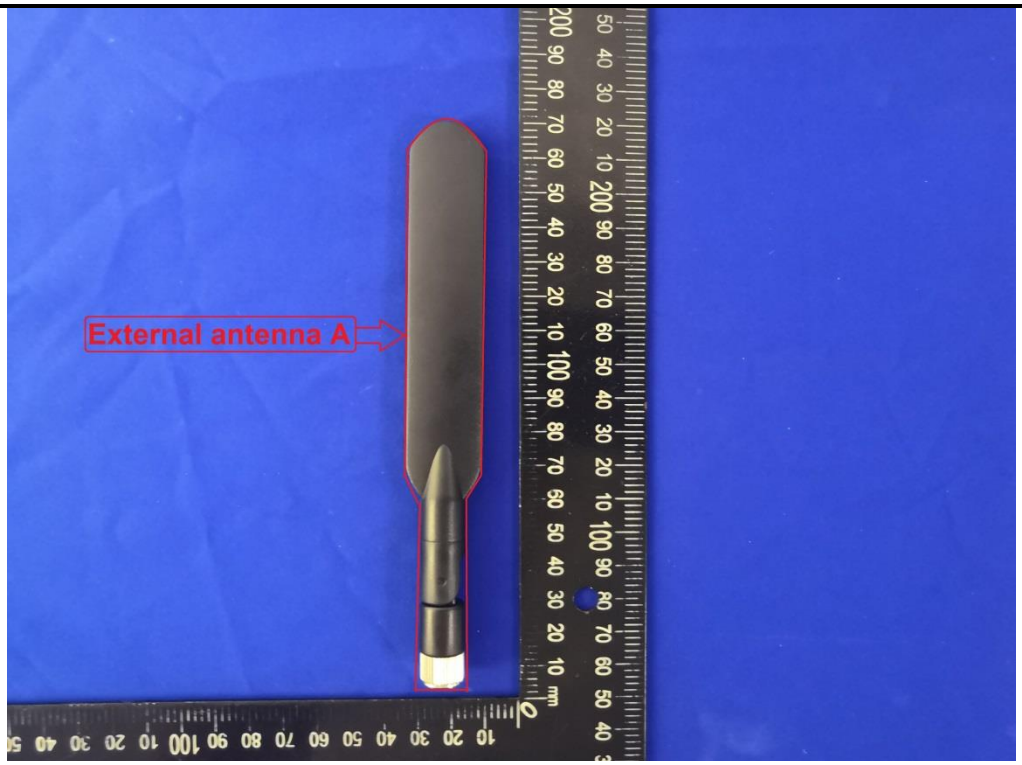

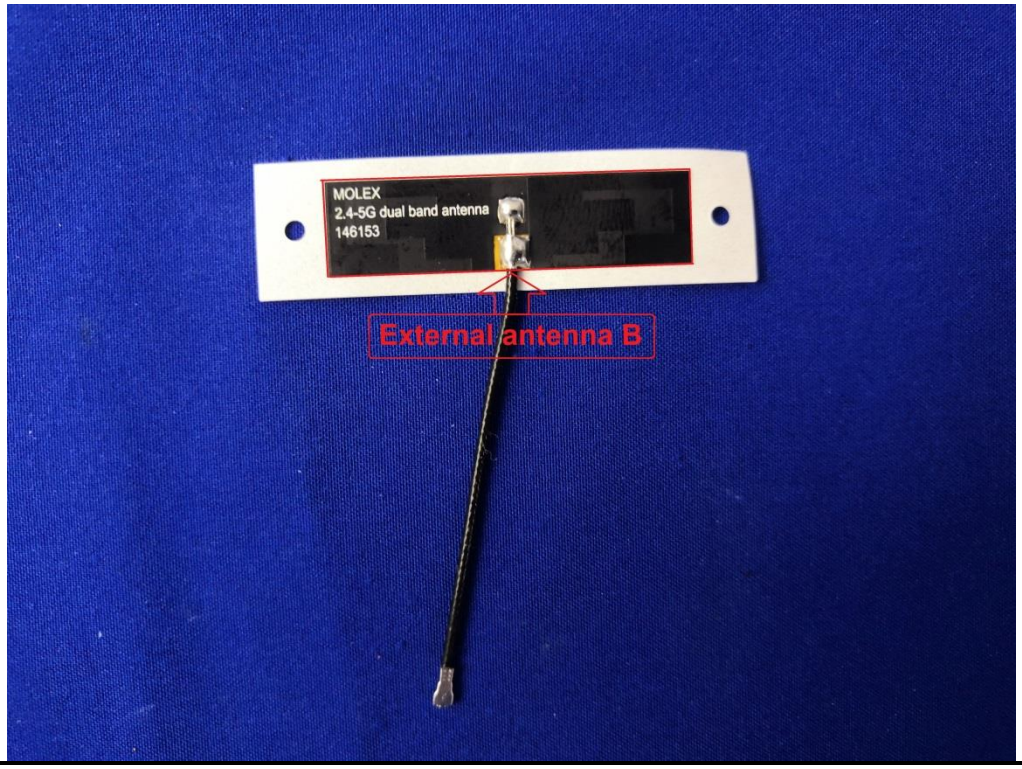

------End of report------