

TEST REPORT

Product Name	:	barcode scanner
Brand Mark	:	N/A
Model No.	:	G1-B
FCC ID	:	2BBKD-G1-B
Report Number	:	BLA-EMC-202306-A4002
Date of Sample Receipt	:	2023/6/13
Date of Test	:	2023/6/13 to 2023/10/20
Date of Issue	:	2023/10/20
Test Standard	:	47 CFR Part 15, Subpart C 15.249
Test Result	:	Pass

Prepared for:

Shenzhen Topwise Communication Co., Ltd
Floor5, Shengtang Mansion East Block, Tairan 9th Rd, Futian
District, shenzhen.

Prepared by:

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Compiled by:

Jozu

Review by:

Sueelle

Approved by:

Blue Zheng

Date:

2023/10/20



REPORT REVISE RECORD

Version No.	Date	Description
00	2023/10/20	Original

BlueAsia

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1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass

2 GENERAL INFORMATION

Applicant	Shenzhen Topwise Communication Co., Ltd
Address	Floor5,Shengtang Mansion East Block,Tairan 9thRd, Futian District,shenzhen.
Manufacturer	Shenzhen Topwise Communication Co., Ltd
Address	Floor 5, Tiandiyuan Shengtang Mansion East Block, No.1 Tairan 9th Rd, Futian District, Shenzhen 518042, Guangdong, P.R.China
Factory	Shenzhen Topwise Communication Co., Ltd
Address	Floor 5, Tiandiyuan Shengtang Mansion East Block, No.1 Tairan 9th Rd, Futian District, Shenzhen 518042, Guangdong, P.R.China
Product Name	barcode scanner
Test Model No.	G1-B

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V01																																																																																
Software Version	V01																																																																																
Channel Spacing:	≥1MHz																																																																																
Frequency Range:	2402MHz~2480MHz																																																																																
Modulation Type:	GFSK																																																																																
Number of Channels:	79 (declared by the client) <table border="1" data-bbox="516 1179 897 1684"> <tr><td>2402</td><td>2422</td><td>2442</td><td>2462</td></tr> <tr><td>2403</td><td>2423</td><td>2443</td><td>2463</td></tr> <tr><td>2404</td><td>2424</td><td>2444</td><td>2464</td></tr> <tr><td>2405</td><td>2425</td><td>2445</td><td>2465</td></tr> <tr><td>2406</td><td>2426</td><td>2446</td><td>2466</td></tr> <tr><td>2407</td><td>2427</td><td>2447</td><td>2467</td></tr> <tr><td>2408</td><td>2428</td><td>2448</td><td>2468</td></tr> <tr><td>2409</td><td>2429</td><td>2449</td><td>2469</td></tr> <tr><td>2410</td><td>2430</td><td>2450</td><td>2470</td></tr> <tr><td>2411</td><td>2431</td><td>2451</td><td>2471</td></tr> <tr><td>2412</td><td>2432</td><td>2452</td><td>2472</td></tr> <tr><td>2413</td><td>2433</td><td>2453</td><td>2473</td></tr> <tr><td>2414</td><td>2434</td><td>2454</td><td>2474</td></tr> <tr><td>2415</td><td>2435</td><td>2455</td><td>2475</td></tr> <tr><td>2416</td><td>2436</td><td>2456</td><td>2476</td></tr> <tr><td>2417</td><td>2437</td><td>2457</td><td>2477</td></tr> <tr><td>2418</td><td>2438</td><td>2458</td><td>2478</td></tr> <tr><td>2419</td><td>2439</td><td>2459</td><td>2479</td></tr> <tr><td>2420</td><td>2440</td><td>2460</td><td>2480</td></tr> <tr><td>2421</td><td>2441</td><td>2461</td><td></td></tr> </table>	2402	2422	2442	2462	2403	2423	2443	2463	2404	2424	2444	2464	2405	2425	2445	2465	2406	2426	2446	2466	2407	2427	2447	2467	2408	2428	2448	2468	2409	2429	2449	2469	2410	2430	2450	2470	2411	2431	2451	2471	2412	2432	2452	2472	2413	2433	2453	2473	2414	2434	2454	2474	2415	2435	2455	2475	2416	2436	2456	2476	2417	2437	2457	2477	2418	2438	2458	2478	2419	2439	2459	2479	2420	2440	2460	2480	2421	2441	2461	
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2420	2440	2460	2480																																																																														
2421	2441	2461																																																																															
Antenna Type:	Internal Metal ANT																																																																																
Antenna Gain:	0dBi(Provided by the applicant)																																																																																
Battery information:	DC3.7V																																																																																

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	DC3.7V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation.

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel	2402MHz
The Middle channel	2441MHz
The Highest channel	2480MHz

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %
Radiated Emission (30MHz ~ 1000MHz)	±4.35 dB
Radiated Emission (1GHz ~ 18GHz)	±4.44 dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
--	--	--	--	--

Note:
"--" means no any support device during testing.

8 LABORATORY LOCATION

All tests were performed at:

BlueAsia of Technical Services(Shenzhen) Co., Ltd.

Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Radiated Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber 1	SKET	966	N/A	2020/11/10	2023/11/9
Chamber 2	SKET	966	N/A	2021/07/20	2023/11/9
Spectrum	R&S	FSP40	100817	2023/08/30	2024/08/29
Receiver	R&S	ESR7	101199	2023/08/30	2024/08/29
Receiver	R&S	ESPI7	101477	2023/07/07	2024/07/06
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2022/10/12	2025/10/11
Horn Antenna	Schwarzbeck	BBHA9120D	01892 P:00331	2022/09/13	2025/09/12
Horn Antenna	Schwarzbeck	BBHA 9170	1106	2022/04/24	2024/04/23
Amplifier	SKET	LNPA_30M01G-30	SK2021060801	2023/07/07	2024/07/06
Amplifier	SKET	PA-000318G-45	N/A	2023/08/30	2024/08/29
Amplifier	SKET	LNPA_18G40G-50	SK2022071301	2023/07/14	2024/07/13
Filter group	SKET	2.4G/5G Filter group r	N/A	2023/07/07	2024/07/06
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2022/09/14	2025/09/13
1kHz calibration audio source	SKET	MCS-ABT-C35	N/A	2023/09/04	2024/09/03
Free Field Microphone	SKET	MGS MP 663	0414	2023/09/04	2024/09/03
Audio shielding box	SKET	SB-ABT-C35	N/A	2023/03/30	2024/03/29
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A

Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A
Signal Generator DTV	ECREDIX	DSG-1000	N/A	N/A	N/A

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Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Shield room	SKET	833	N/A	2020/11/25	2023/11/24
Receiver	R&S	ESPI3	101082	2023/08/30	2024/08/29
LISN	R&S	ENV216	3560.6550.15	2023/08/30	2024/08/29
LISN	AT	AT166-2	AKK1806000003	2023/08/30	2024/08/29
ISN	TESEQ	ISNT8-cat6	53580	2023/08/30	2024/08/29
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01045	2023/07/07	2024/07/06
Single-channel vehicle artificial power network	Schwarzbeck	NNBM 8124	01075	2023/07/07	2024/07/06
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A

Test Equipment Of RF Conducted Test					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	2023/08/30	2024/08/29
Spectrum	Agilent	N9020A	MY49100060	2023/08/30	2024/08/29
Spectrum	Agilent	N9020A	MY54420161	2023/08/30	2024/08/29
Signal Generator	Agilent	N5182A	MY47420955	2023/08/30	2024/08/29
Signal Generator	Agilent	N5181A	MY46240904	2023/07/07	2024/07/06
Signal Generator	R&S	CMW500	132429	2023/08/30	2024/08/29
BluetoothTester	Anritsu	MT8852B	06262047872	2023/08/30	2024/08/29
Power probe	DARE	RPR3006W	14I00889SN042	2023/09/01	2024/08/31
Power detection box	CDKMV	MW100-PSB	MW201020JYT	2023/07/07	2024/07/06
DCPowersupply	zhaoxin	KXN-305D	20K305D1221363	2023/08/30	2024/08/29
DCPowersupply	zhaoxin	RXN-1505D	19R1505D050168	2023/08/30	2024/08/29

2.4GHz/5GHz RF Test software	MTS	MTS 8310	Version 2.0.0.0	N/A	N/A
Audio Analyzer	Audio Precision	ATS-1	ATS141094	2023/07/07	2024/07/06

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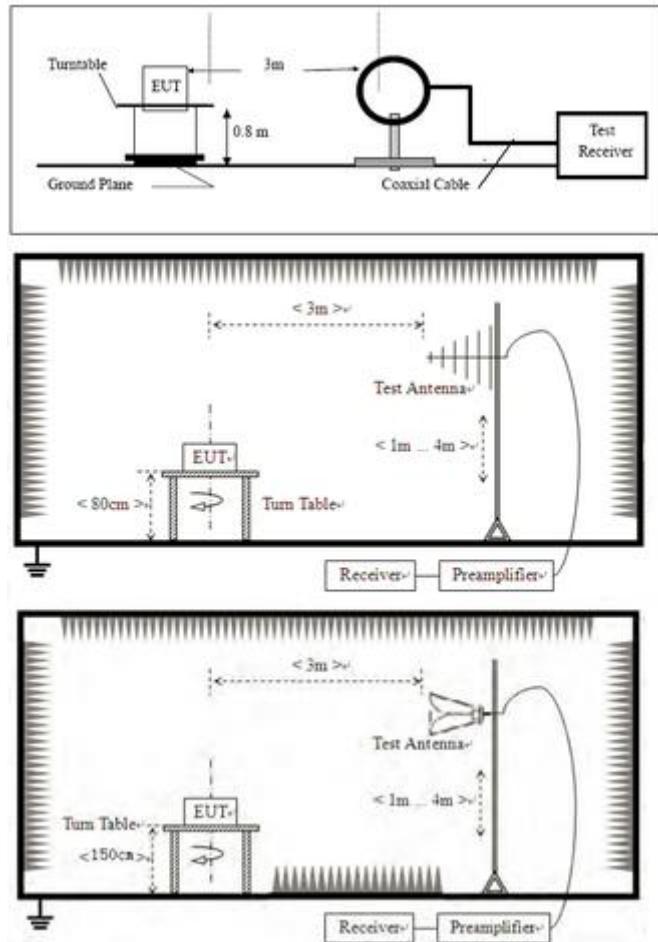
10 RADIATED EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

10.1 LIMITS

Frequency	Field strength (microvolt/meter)	Limit (dB μ V/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F (kHz)	-	-	300
0.490MHz-1.705MHz	24000/F (kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

10.2 BLOCK DIAGRAM OF TEST SETUP



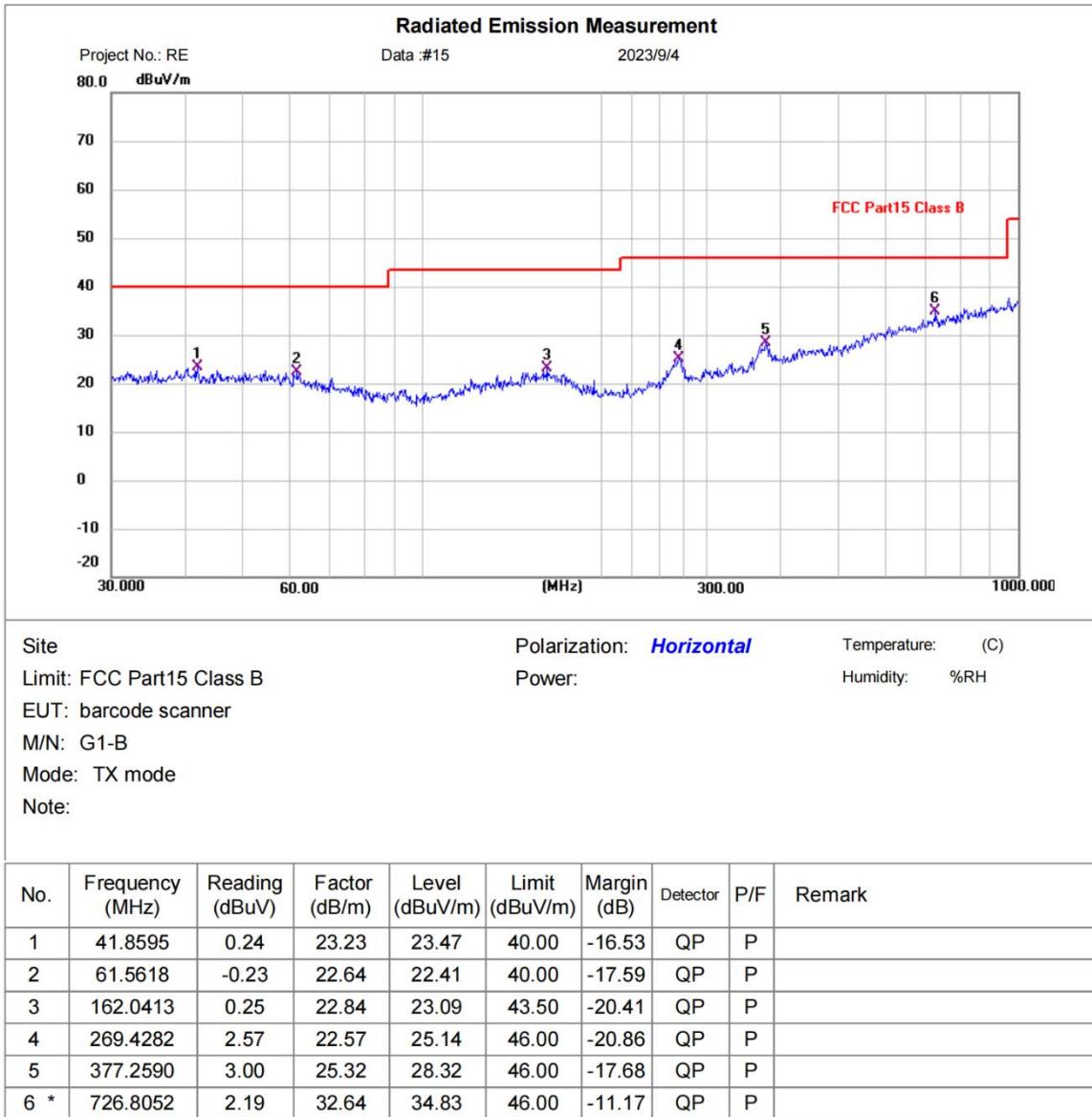
10.3 PROCEDURE

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

Scan from 9kHz to 25GHz, 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. fundamental frequency is blocked by filter, and only spurious emission is shown.

10.4 TEST DATA

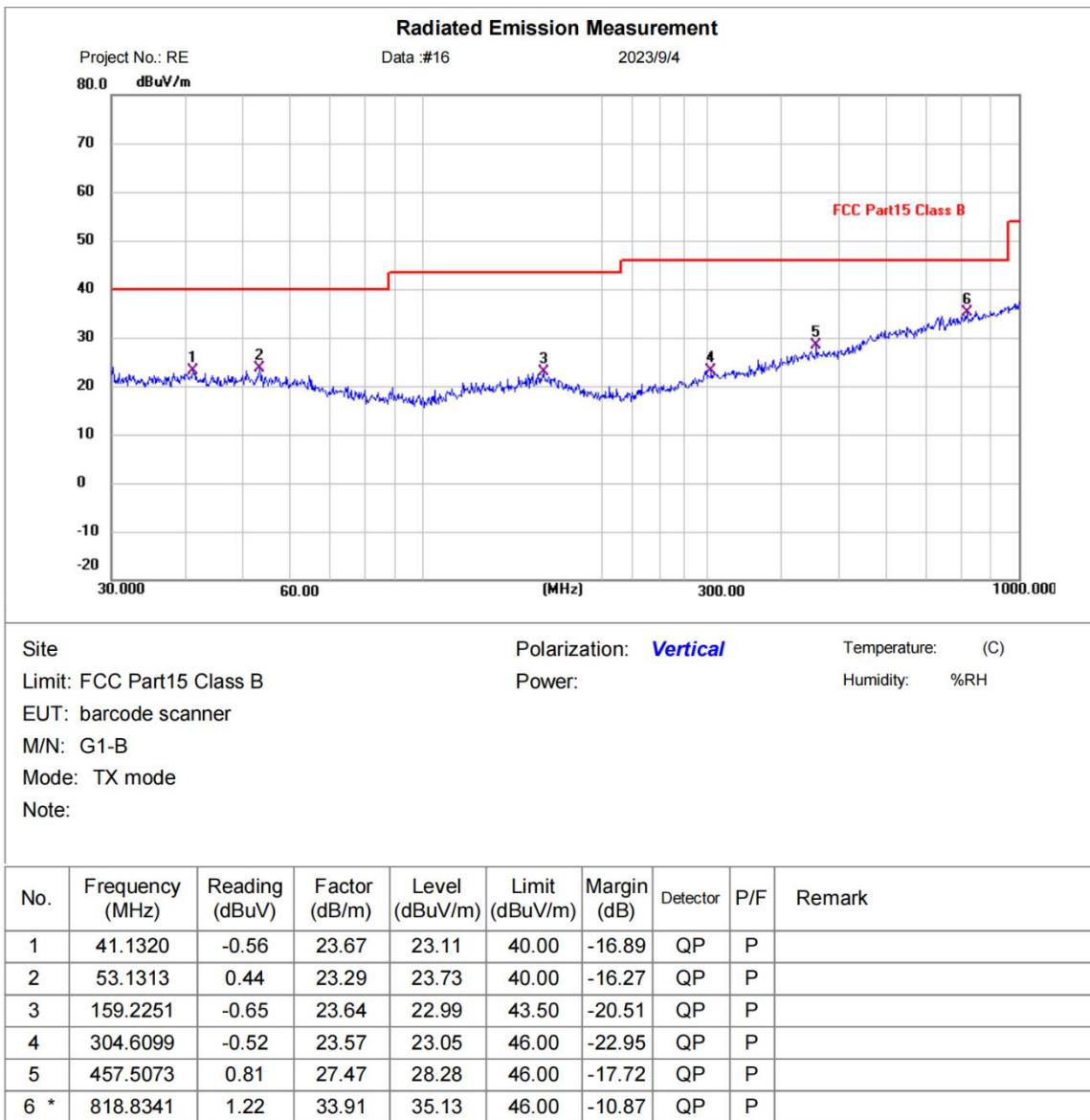
[TestMode: TX below 1G]; [Polarity: Horizontal]



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

Test Result: Pass

[TestMode: TX below 1G]; [Polarity: Vertical]

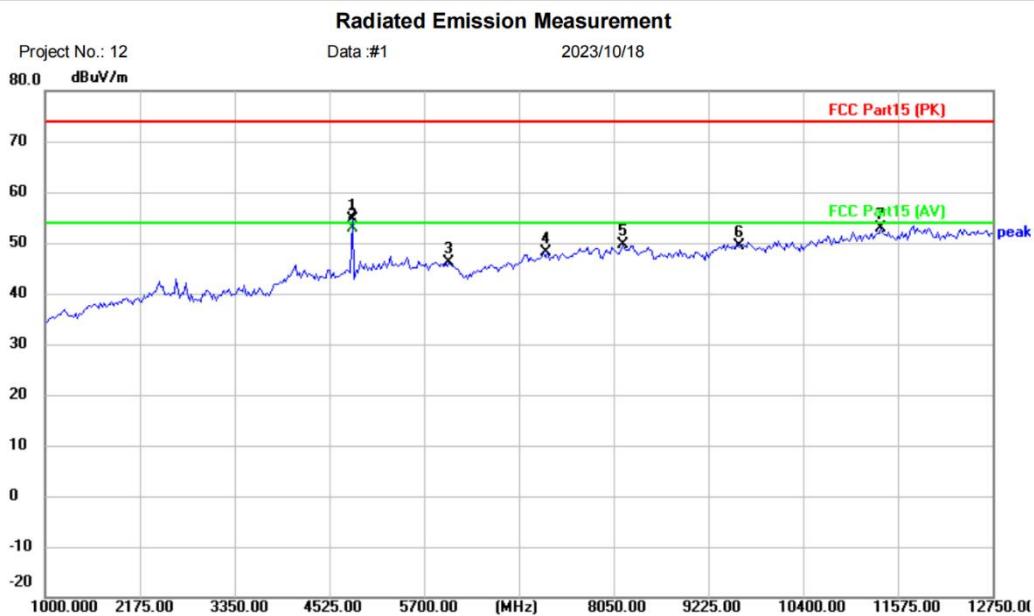


*:Maximum data x:Over limit !:over margin

Test Result: Pass

Above 1GHz

[TestMode: TX low channel]; [Polarity: Horizontal]



Site	Polarization: Horizontal	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: barcode scanner		
M/N: G1-B		
Mode: TX-2402		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4807.000	50.61	4.07	54.68	74.00	-19.32	peak	
2	*	4807.000	48.81	4.07	52.88	54.00	-1.12	AVG	
3		6005.500	42.14	3.92	46.06	74.00	-27.94	peak	
4		7206.000	40.12	7.93	48.05	74.00	-25.95	peak	
5		8167.500	40.62	8.98	49.60	74.00	-24.40	peak	
6		9608.000	38.55	10.90	49.45	74.00	-24.55	peak	
7		11363.50	39.15	13.62	52.77	74.00	-21.23	peak	

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

⟨Reference Only

Receiver: ESR_1

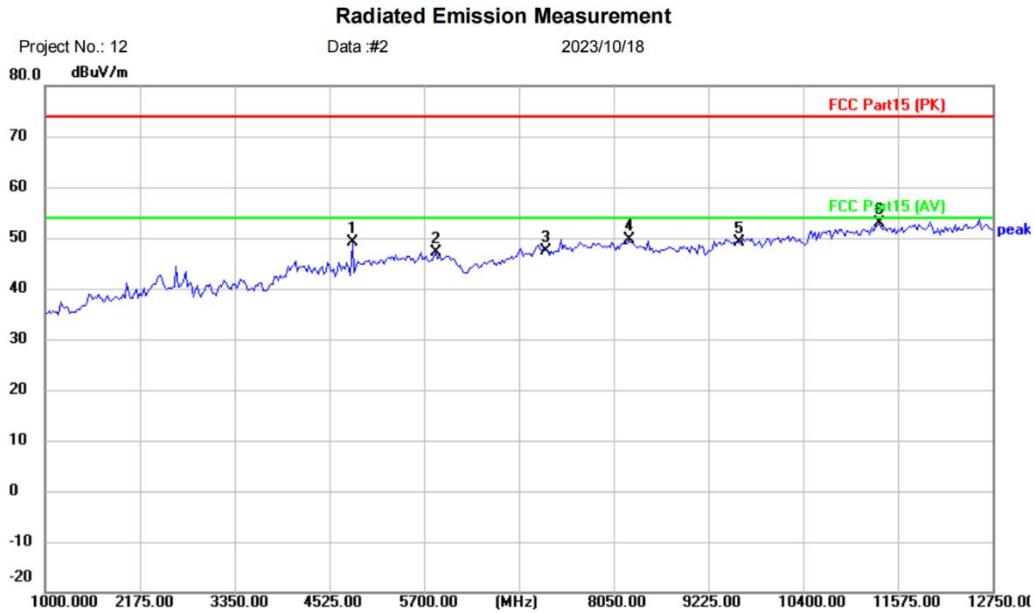
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G

Engineer Signature:

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Vertical]



Site: Limit: FCC Part15 (PK) EUT: barcode scanner M/N: G1-B Mode: TX-2402 Note: Polarization: **Vertical** Power: Temperature: (C) Humidity: %RH

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4807.000	45.18	4.07	49.25	74.00	-24.75	peak	
2		5841.000	40.35	6.78	47.13	74.00	-26.87	peak	
3		7206.000	39.42	7.93	47.35	74.00	-26.65	peak	
4		8238.000	40.58	9.00	49.58	74.00	-24.42	peak	
5		9608.000	38.20	10.90	49.10	74.00	-24.90	peak	
6	*	11340.00	39.29	13.60	52.89	74.00	-21.11	peak	

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

⟨Reference Only

Receiver: ESR_1

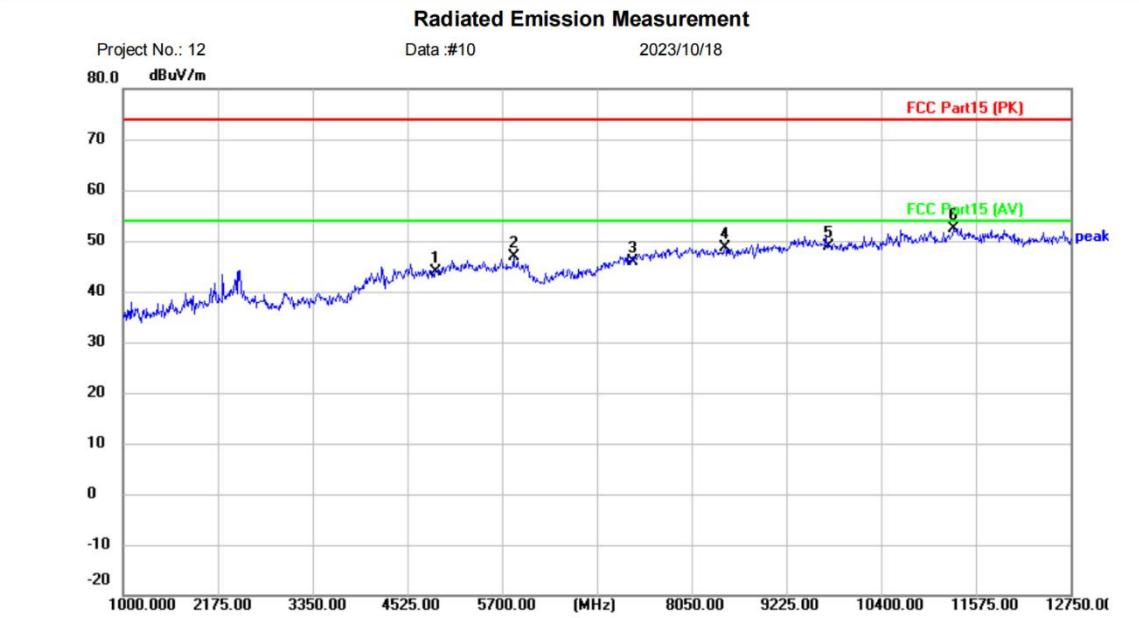
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G

Engineer Signature:

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Vertical]



Site: Polarization: **Vertical** Temperature: (C)
Limit: FCC Part15 (PK) Power: Humidity: %RH
EUT: barcode scanner
M/N: G1-B
Mode: TX-2441
Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment		Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4882.000	39.33	4.60	43.93	74.00	-30.07	peak
2		5841.000	40.32	6.49	46.81	74.00	-27.19	peak
3		7323.000	38.02	7.82	45.84	74.00	-28.16	peak
4		8461.250	39.36	9.25	48.61	74.00	-25.39	peak
5		9764.000	37.06	11.76	48.82	74.00	-25.18	peak
6	*	11293.00	39.13	13.37	52.50	74.00	-21.50	peak

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

⟨Reference Only

Receiver: ESR_1

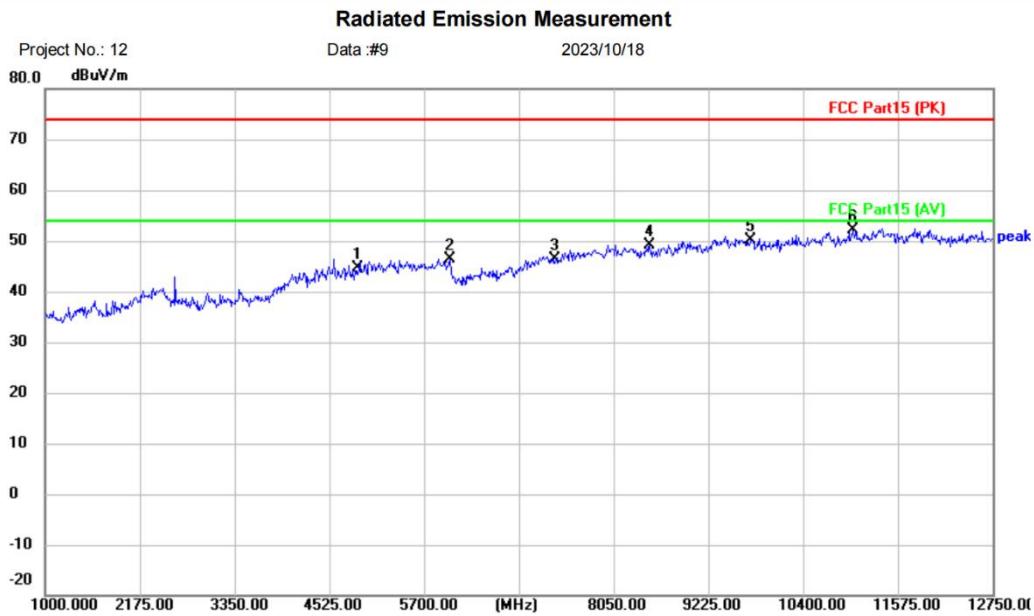
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G new

Engineer Signature:

Test Result: Pass

[TestMode: TX mid channel]; [Polarity: Horizontal]



Site	Polarization: Horizontal	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: barcode scanner		
M/N: G1-B		
Mode: TX-2441		
Note:		

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.000	39.97	4.60	44.57	74.00	-29.43	peak	
2		6017.250	42.81	3.57	46.38	74.00	-27.62	peak	
3		7323.000	38.67	7.82	46.49	74.00	-27.51	peak	
4		8496.500	39.59	9.43	49.02	74.00	-24.98	peak	
5		9764.000	38.46	11.76	50.22	74.00	-23.78	peak	
6	*	11022.75	38.46	13.69	52.15	74.00	-21.85	peak	

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

⟨Reference Only

Receiver: ESR_1

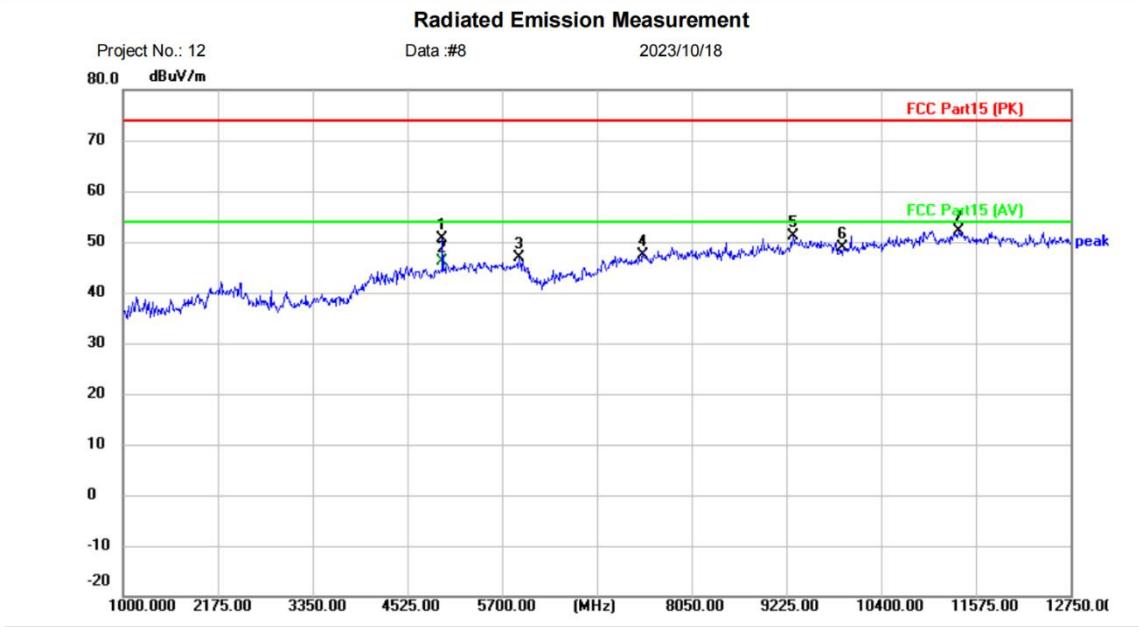
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G new

Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site: Polarization: **Vertical** Temperature: (C)
Limit: FCC Part15 (PK) Power: Humidity: %RH
EUT: barcode scanner
M/N: G1-B
Mode: TX-2480
Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4959.750	45.05	5.47	50.52	74.00	-23.48	peak	
2	*	4959.750	40.76	5.47	46.23	54.00	-7.77	AVG	
3		5911.500	40.13	6.75	46.88	74.00	-27.12	peak	
4		7440.000	39.06	8.24	47.30	74.00	-26.70	peak	
5		9307.250	39.74	11.42	51.16	74.00	-22.84	peak	
6		9920.000	36.85	11.96	48.81	74.00	-25.19	peak	
7		11363.50	38.75	13.40	52.15	74.00	-21.85	peak	

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

⟨Reference Only

Receiver: ESR_1

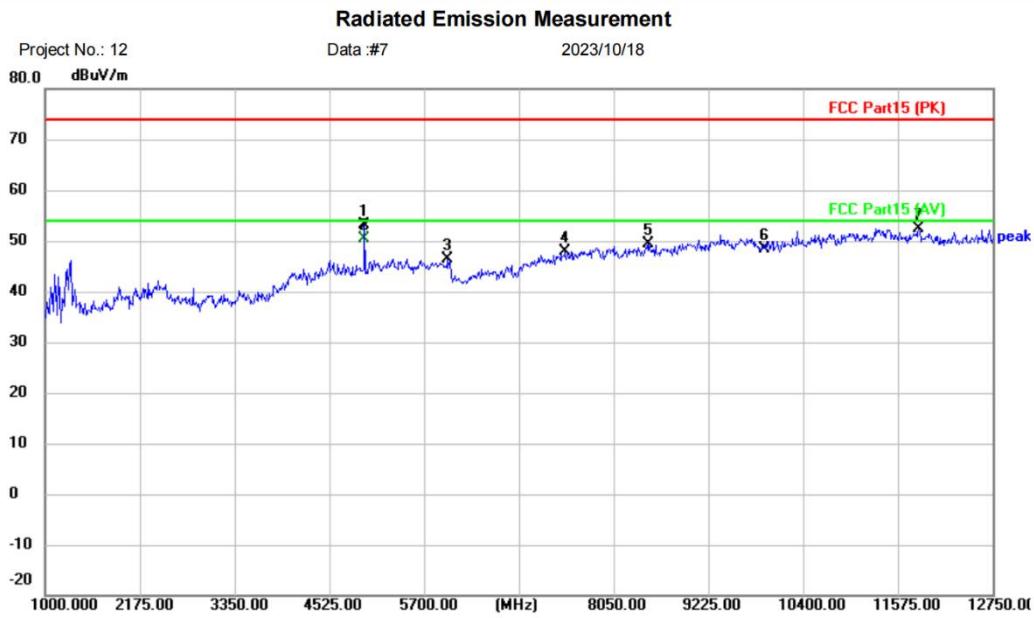
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G new

Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site	Polarization: Horizontal	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: barcode scanner		
M/N: G1-B		
Mode: TX-2480		
Note:		

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment		Detector	Comment
1		4959.750	47.54	5.47	53.01	74.00	-20.99	peak
2	*	4959.750	44.79	5.47	50.26	54.00	-3.74	AVG
3		5993.750	39.75	6.70	46.45	74.00	-27.55	peak
4		7440.000	39.57	8.24	47.81	74.00	-26.19	peak
5		8484.750	40.05	9.37	49.42	74.00	-24.58	peak
6		9920.000	36.46	11.96	48.42	74.00	-25.58	peak
7		11833.50	39.40	13.00	52.40	74.00	-21.60	peak

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

⟨Reference Only

Receiver: ESR_1

Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G new

Engineer Signature:

Test Result: Pass

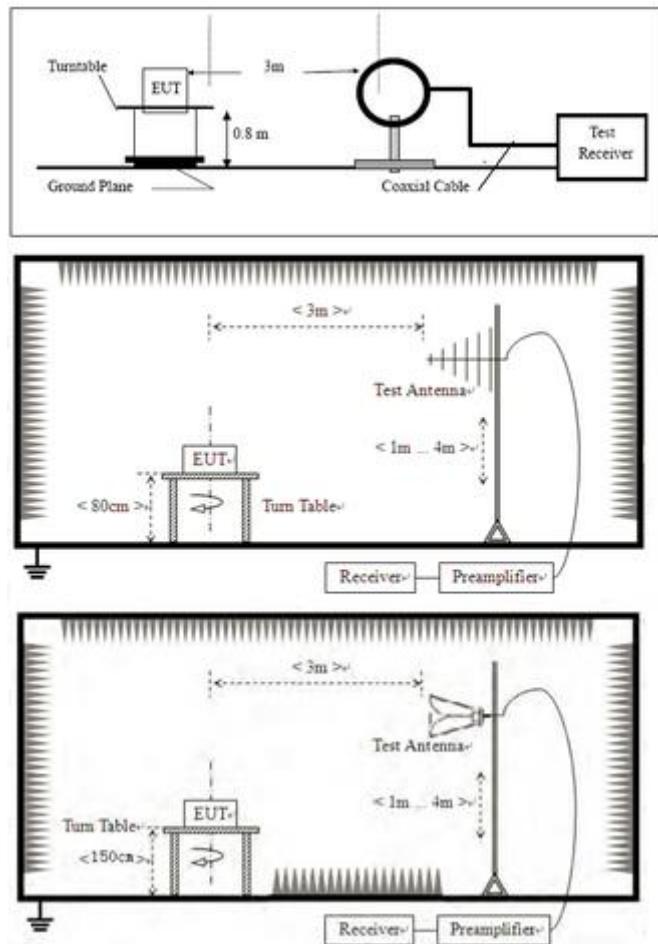
11 RESTRICTED BAND AROUND FUNDAMENTAL FREQUENCY

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.4&6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

11.1 LIMITS

Frequency	Limit (dB μ V/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

11.2 BLOCK DIAGRAM OF TEST SETUP



11.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

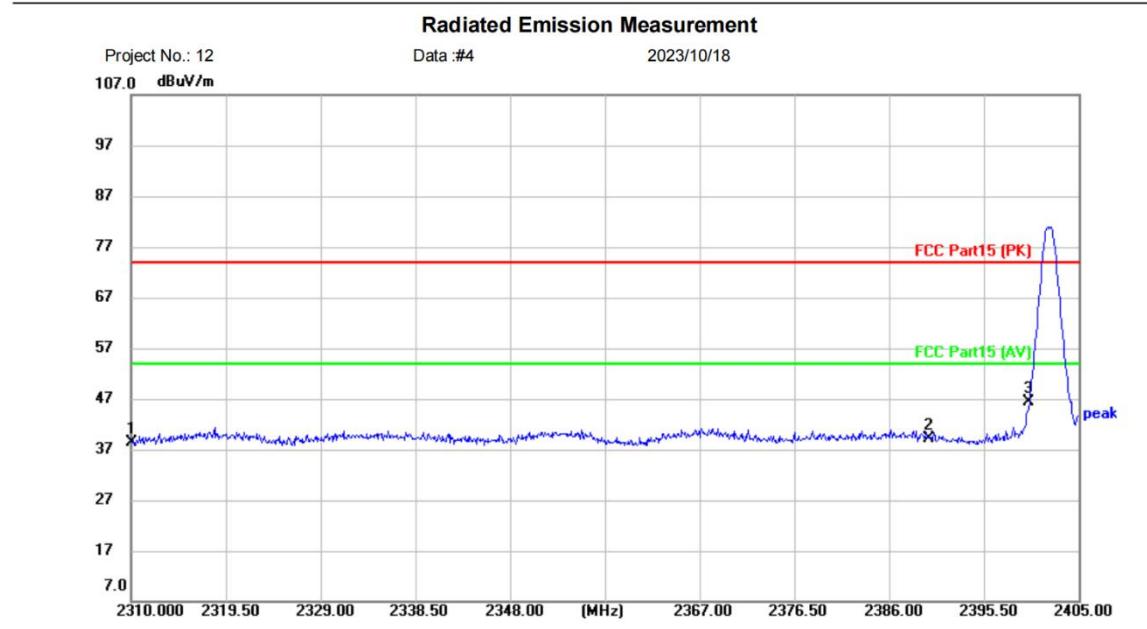
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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11.4 TEST DATA

[TestMode: TX low channel]; [Polarity: Horizontal]



Site	Polarization: <i>Horizontal</i>	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: barcode scanner		
M/N: G1-B		
Mode: TX-2402		
Note:		

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
1		2310.000	42.65	-4.27	38.38	74.00	-35.62	peak	
2		2390.000	42.91	-3.82	39.09	74.00	-34.91	peak	
3	*	2400.000	50.24	-3.77	46.47	74.00	-27.53	peak	

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

⟨Reference Only

Receiver: ESR_1

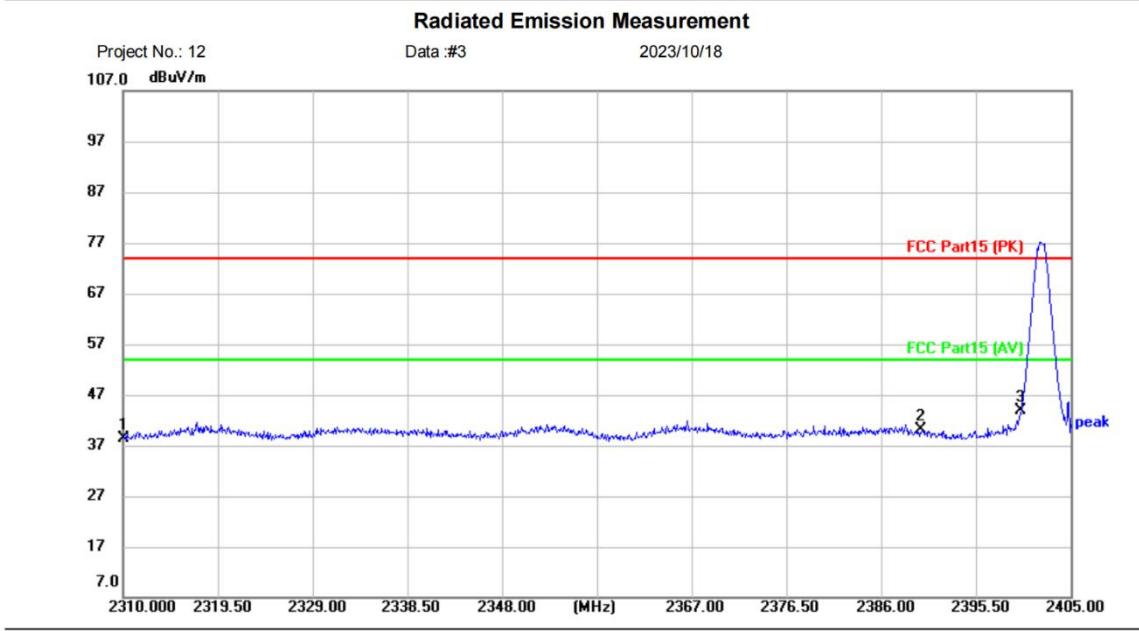
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G

Engineer Signature:

Test Result: Pass

[TestMethod: TX low channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dB			
1		2310.000	42.77	-4.27	38.50	74.00	-35.50	peak	
2		2390.000	44.06	-3.82	40.24	74.00	-33.76	peak	
3	*	2400.000	47.62	-3.77	43.85	74.00	-30.15	peak	

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

⟨Reference Only⟩

Receiver: ESR_1

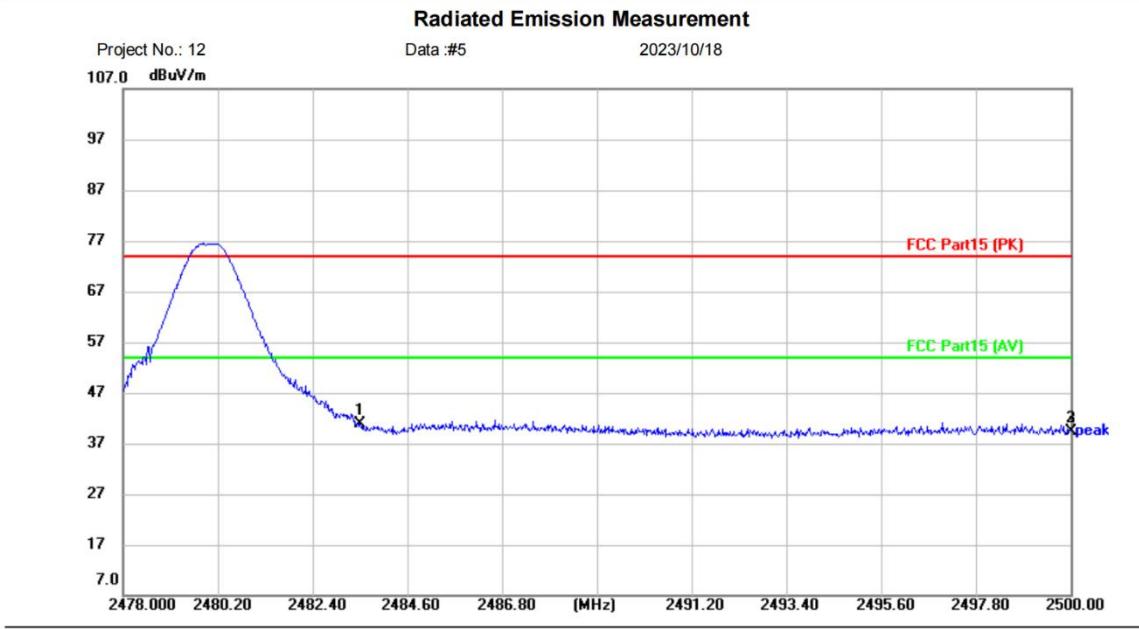
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G

Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]



Site: Polarization: **Vertical** Temperature: (C)
Limit: FCC Part15 (PK) Power: Humidity: %RH
EUT: barcode scanner
M/N: G1-B
Mode: TX-2480
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	44.79	-3.96	40.83	74.00	-33.17	peak	
2		2500.000	43.47	-4.00	39.47	74.00	-34.53	peak	
3		2500.000	43.47	-4.00	39.47	74.00	-34.53	peak	

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

⟨Reference Only

Receiver: ESR_1

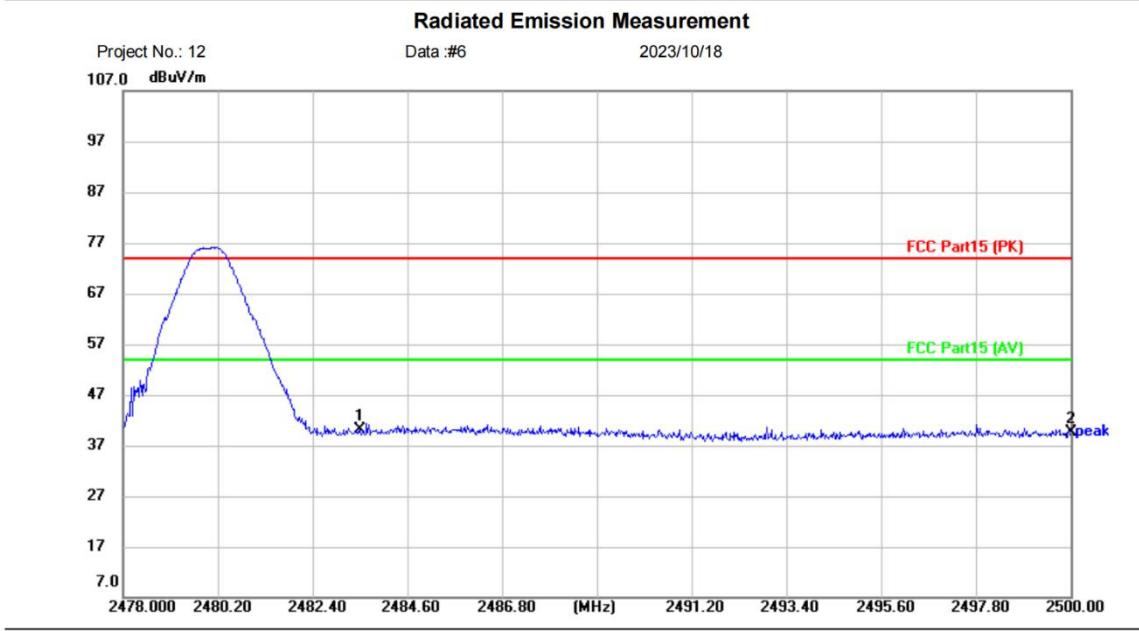
Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G

Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Horizontal]



Site	Polarization: <i>Horizontal</i>	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: barcode scanner		
M/N: G1-B		
Mode: TX-2480		
Note:		

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
1	*	2483.500	44.01	-3.96	40.05	74.00	-33.95	peak
2		2500.000	43.74	-4.00	39.74	74.00	-34.26	peak

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

⟨Reference Only

Receiver: ESR_1

Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G

Engineer Signature:

Test Result: Pass

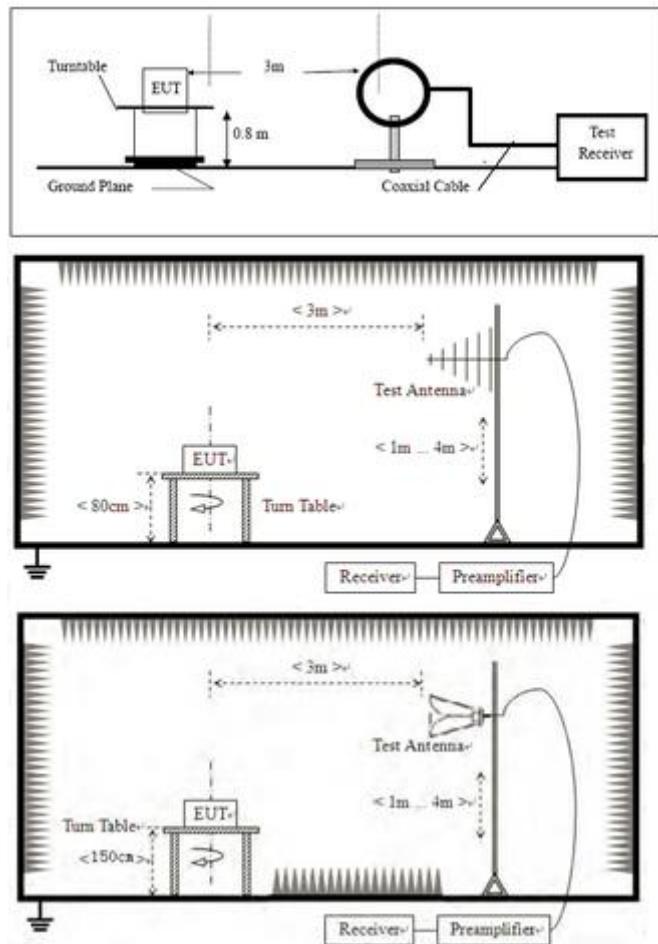
12 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.249(A))

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.5&6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

12.1 LIMITS

Frequency	Limit (dB μ V/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

12.2 BLOCK DIAGRAM OF TEST SETUP



12.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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12.4 TEST DATA

Peak value:

Frequency (MHz)	Reading Level (dB μ V)	Correct Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Antenna Polaxis
2402	81.63	-3.63	78.00	114.00	-36.00	H
2402	75.25	-3.63	71.62	114.00	-42.38	V
2441	79.98	-3.33	76.65	114.00	-37.35	H
2441	73.06	-3.33	69.73	114.00	-44.27	V
2480	77.55	-3.02	74.53	114.00	-39.47	H
2480	71.28	-3.02	68.26	114.00	-45.74	V

Average value:

Frequency (MHz)	Reading Level (dB μ V)	Correct Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Antenna Polaxis
2402	77.23	-3.63	73.60	94.00	-20.40	H
2402	70.65	-3.63	67.02	94.00	-26.98	V
2441	75.53	-3.33	72.20	94.00	-21.80	H
2441	69.20	-3.33	65.87	94.00	-28.13	V
2480	74.05	-3.02	71.03	94.00	-22.97	H
2480	67.69	-3.02	64.67	94.00	-29.33	V

NOTE: RBW=5MHz, VBW=10 MHz, PK detector is for PK value, RMS detector is for AV value.

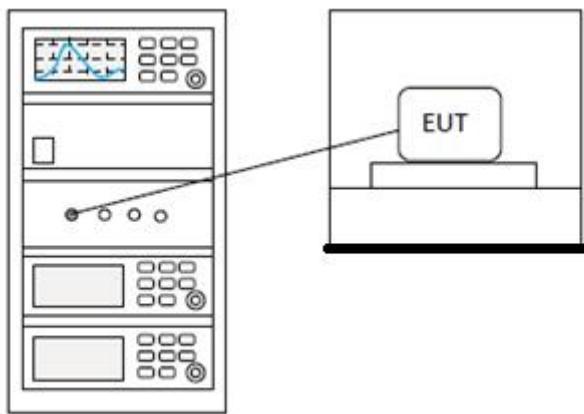
13 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.9
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25 °C
Humidity	60%

13.1 LIMITS

Limit:	N/A
---------------	-----

13.2 BLOCK DIAGRAM OF TEST SETUP



13.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

14 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	N/A

14.1 CONCLUSION

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

15 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

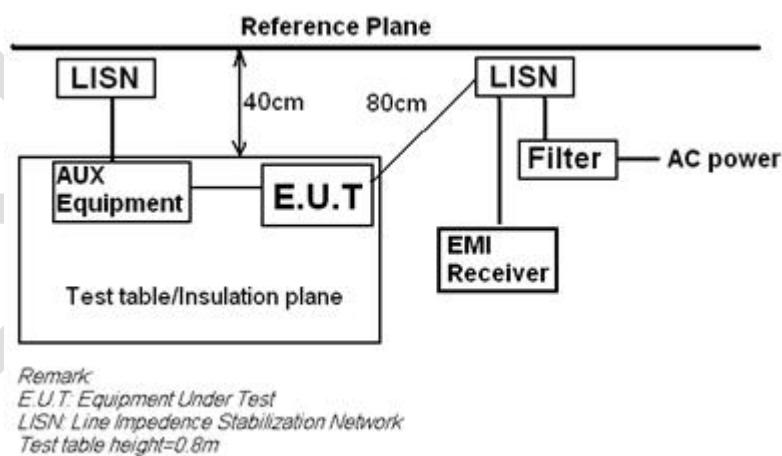
Test Standard	47 CFR Part 15, Subpart C 15.249
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25°C
Humidity	60%

15.1 LIMITS

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

*Decreases with the logarithm of the frequency.

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 PROCEDURE

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 50hm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

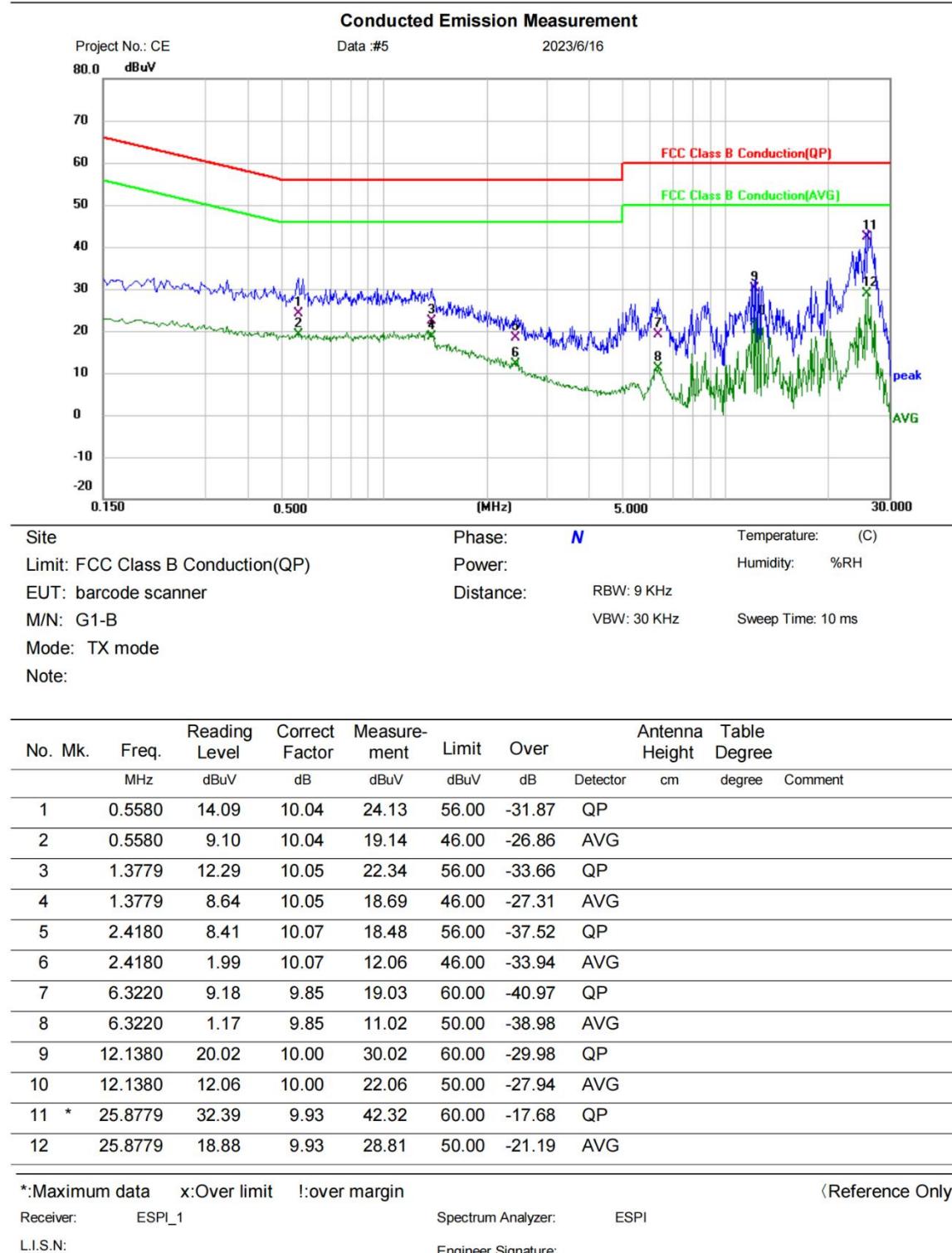
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

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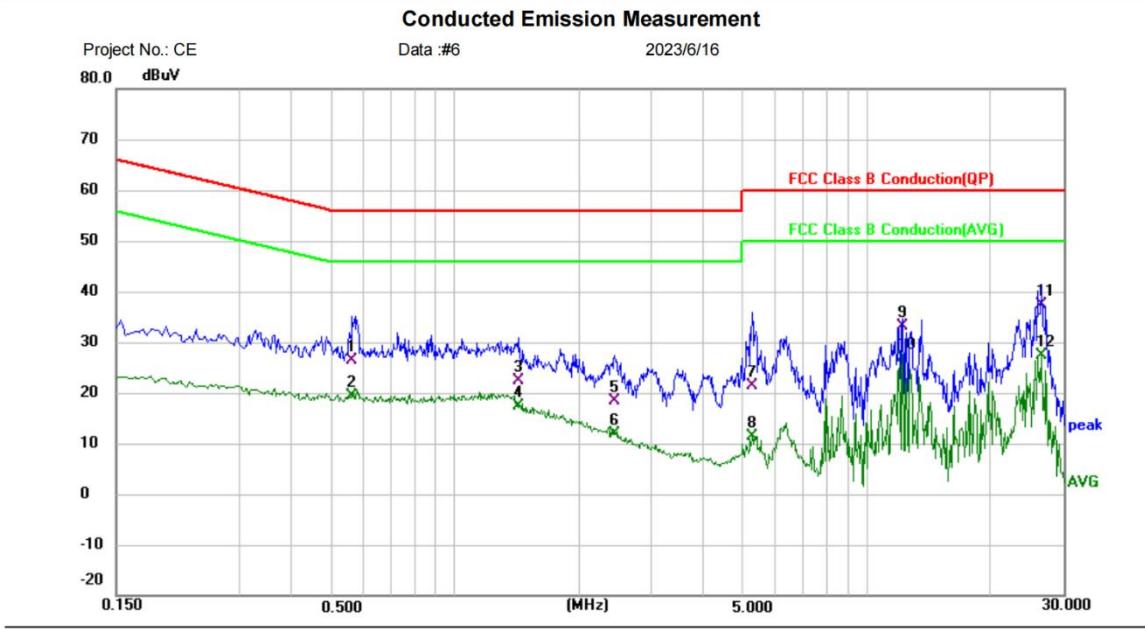
15.4 TEST DATA

[TestMode: TX]; [Line: Nutral] ;[Power:AC120V/60Hz]



Test Result: Pass

[TestMode: TX]; [Line: Line] ;[Power:AC120V/60Hz]



Site	Phase:	L1	Temperature: (C)
Limit: FCC Class B Conduction(QP)	Power:		Humidity: %RH
EUT: barcode scanner	Distance:	RBW: 9 KHz	
M/N: G1-B		VBW: 30 KHz	Sweep Time: 10 ms
Mode: TX mode			
Note:			

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
			Level	Factor	ment					
		MHz	dBuV	dB	dBuV	dB	Detector	cm	degree	Comment
1		0.5620	16.29	10.08	26.37	56.00	-29.63	QP		
2		0.5620	9.41	10.08	19.49	46.00	-26.51	AVG		
3		1.4260	12.30	10.20	22.50	56.00	-33.50	QP		
4		1.4260	7.06	10.20	17.26	46.00	-28.74	AVG		
5		2.4420	8.05	10.27	18.32	56.00	-37.68	QP		
6		2.4420	1.62	10.27	11.89	46.00	-34.11	AVG		
7		5.2540	11.40	10.02	21.42	60.00	-38.58	QP		
8		5.2540	1.33	10.02	11.35	50.00	-38.65	AVG		
9		12.1980	22.97	10.06	33.03	60.00	-26.97	QP		
10		12.1980	16.73	10.06	26.79	50.00	-23.21	AVG		
11	*	26.6100	27.42	10.00	37.42	60.00	-22.58	QP		
12		26.6100	17.39	10.00	27.39	50.00	-22.61	AVG		

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

⟨Reference Only

Receiver: ESPI_1

Spectrum Analyzer: ESPI

L.I.S.N:

Engineer Signature:

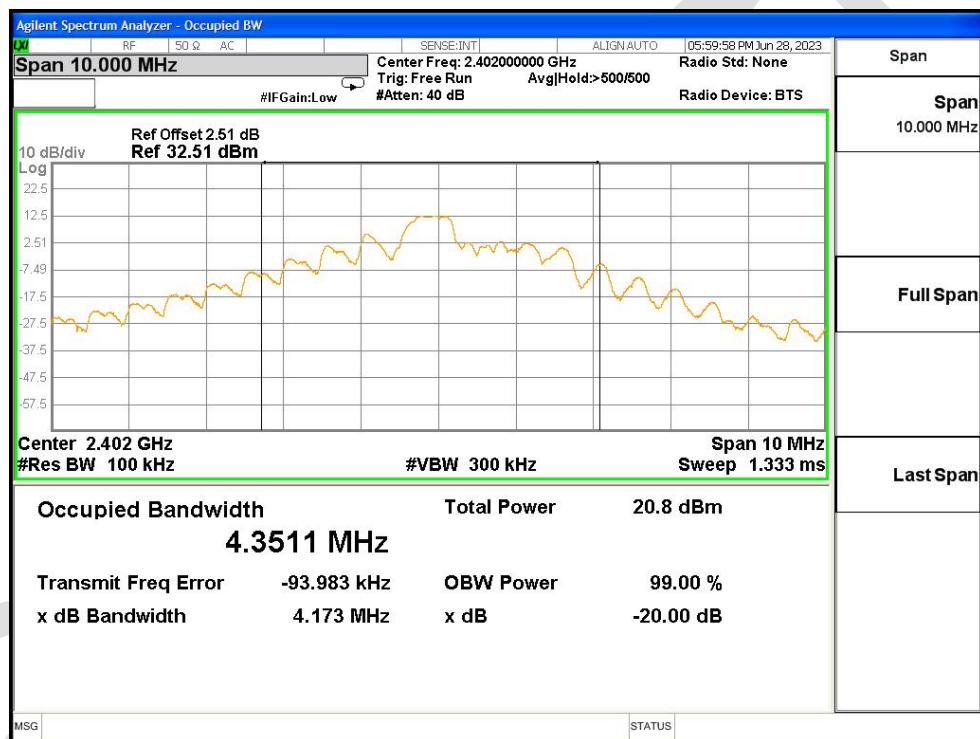
Test Result: Pass

16 APPENDIX

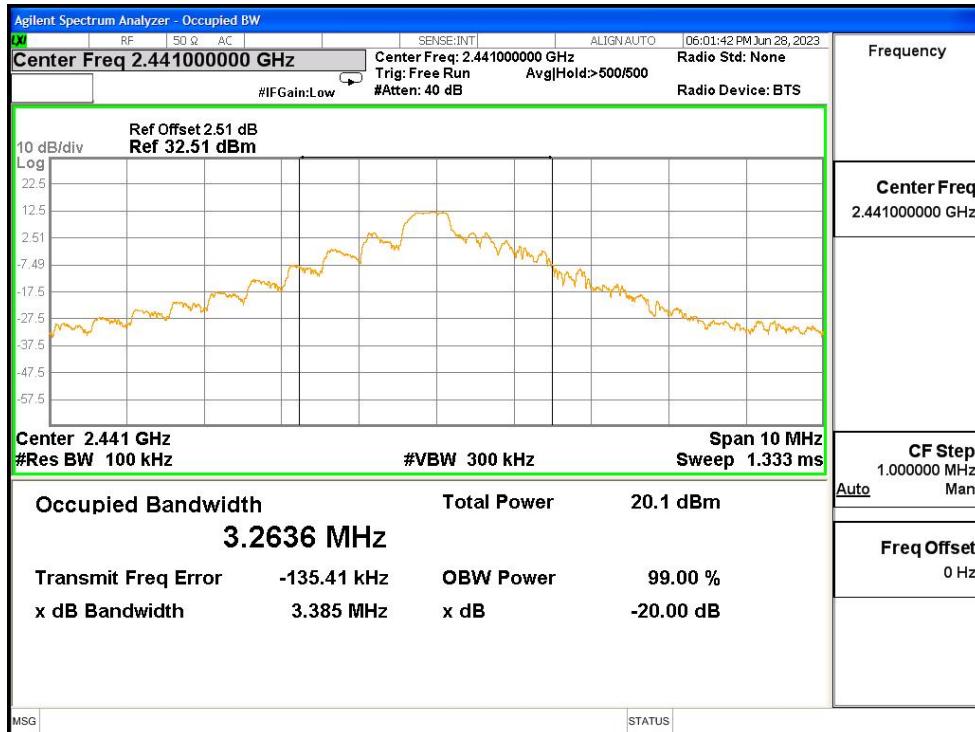
-20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	GFSK	2402	Ant1	4.173	--	Pass
NVNT	GFSK	2441	Ant1	3.385	--	Pass
NVNT	GFSK	2480	Ant1	2.508	--	Pass

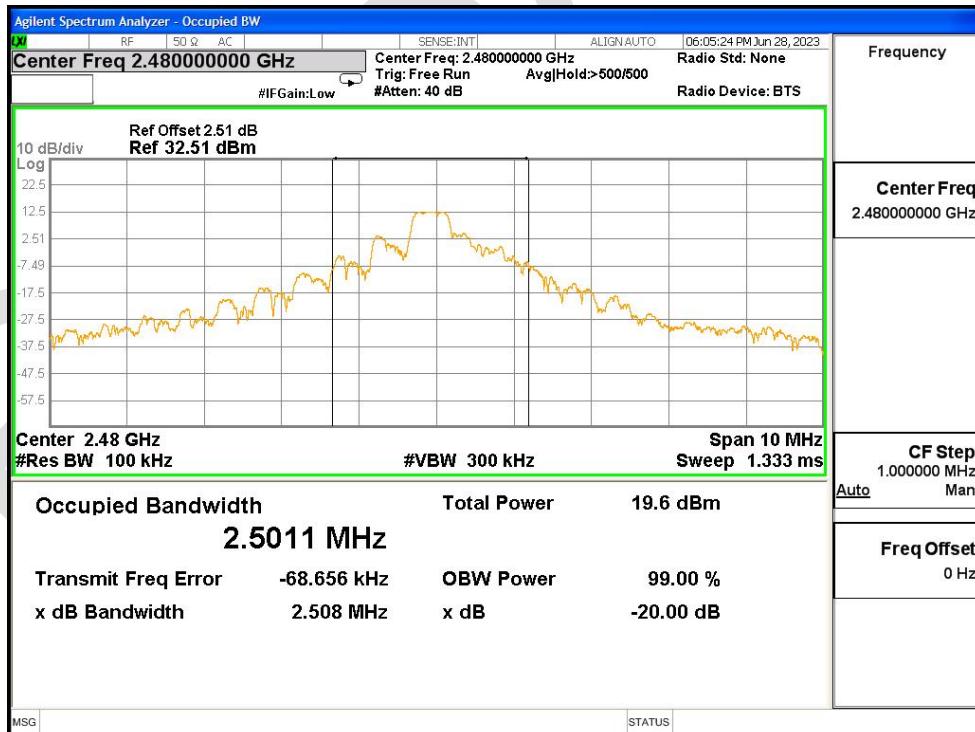
-20dB Bandwidth NVNT GFSK 2407MHz Ant1



-20dB Bandwidth NVNT GFSK 2442MHz Ant1



-20dB Bandwidth NVNT GFSK 2477MHz Ant1



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Radiated Emissions



Conducted Emissions at Mains Terminals (150kHz-30MHz)



APPENDIX B: PHOTOGRAPHS OF EUT

Reference to the test report No. BLA-EMC-202306-A4001

----END OF REPORT----

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