TEST REPORT

Product Name:	RFID Reader
FCC ID:	2BL6J-V2
Trademark:	N/A
Model Number:	V2
Prepared For:	Alcotrack Compliance Pty Ltd
Address:	2 Alexandra Ave, Claremont WA 6010 Australia
Manufacturer:	Alcotrack Compliance Pty Ltd
Address:	2 Alexandra Ave, Claremont WA 6010 Australia
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	Aug. 19, 2024
Sample tested Date:	Aug. 19, 2024 to Nov. 06, 2024
Issue Date:	Nov. 06, 2024
Report No.:	CTB241106010RF
Test Standards	FCC CFR Title 47 Part 15 Subpart C Section 15.225 ANSI C63.10:2013
Test Results	PASS
Remark:	This is 13.56MHz radio test report.

Compiled by:	Reviewed by:	Approved by:
ZhouKui	Arron Liu	Bin Mei / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(Note: N/A means not applicable)

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1. VERSION

Report No.	Issue Date	Description	Approved
CTB241106010RF	Nov. 06, 2024	Original	Valid

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2. TESTSUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Radiated Emission	47 CFR Part 15 Subpart C Section 15.209; 15.225(a)(b)(c)(d)	ANSI C63.10-2013	PASS
Frequency Tolerance	47 CFR Part 15 Subpart C Section 15.225(e)	ANSI C63.10-2013	PASS
Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.215	ANSI C63.10-2013	PASS
Antenna requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS

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3. MEASUREMENTUNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertaintyrepresents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	U=±54.3Hz
Conducted output power Above 1G	U=±1.0dB
Conducted output power below 1G	U=±0.9dB
Power Spectral Density , Conduction	U=±1.0dB
Conduction spurious emissions	U=±2.8dB
Out of band emission	U=±54Hz
3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
humidity uncertainty	U=±5.3%
Temperature uncertainty	U=±0.59℃
Supply voltages	U=±3%
Time	U=±5%

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4. PRODUCT INFORMATION AND TESTSETUP

4.1 Product Information

Model(s): V2

Model Description: N/A

Hardware Version: V2

Software Version: V1.0

Operation Frequency: 13.56MHz

Type of Modulation: ASK

Antenna installation: PCB antenna

Antenna Gain: 1.0dBi

Ratings: DC 5V,1A

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	Laptop	DELL	Vostro 5490	N/A	AE
2.	Adapter	JIYIN	JY-05100C	/	AE

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

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4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode
Keep the EUT in transmitting mode (NFC mode) with modulation.
The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(AC):	120V
Normal Temperature(℃)	23

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5. TEST FACILITY AND TEST INSTRUMENTUSED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test InstrumentUsed

No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2025/6/28
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2025/6/28
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2025/6/28
4	Communication test set	R&S	CMW500	108058	V3.5.80	2025/6/28
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2025/6/28
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2025/6/28
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07 (E1962B)	2025/6/28
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	/	2025/6/30
10	5 GHz Filter	Shenxiang	MSF5150-5850MS-1155	20181015001	/	2025/6/30
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	/	2025/6/30
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	/	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	/	2025/6/28
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	/	2025/6/28
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	/	/
16	966 chamber	C.R.T.	966	/	/	2027/6/21
17	Receiver	R&S	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
18	Amplifier	HP	8447E	2945A02747	/	2025/6/28
19	Amplifier	Agilent	8449B	3008A01838	/	2025/6/28
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/28
21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2025/6/28
22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/

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23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/28
24	loop antenna	ZHINAN	ZN30900A	GTS534	/	/
25	40G Horn antenna	A/H/System	SAS-574	588	/	2025/6/28
26	Amplifier	AEROFLEX	Aeroflex	097	/	2025/6/28
27	Power Metter	KEYSIGHT	N1912AP	N/A	A.05.00	2025/6/28

Continuous disturbance						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	843 Shield Room	C/ R/ T	843	/	/	2027/6/21
2	AMN	ROHDE&SCHWARZ	ESH3-Z5	831551852	/	2025/6/30
3	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	/	2025/6/28
4	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428	V4.42.SP3	2025/6/30
5	Coaxial cable	ZDECL	Z302S	18091904	/	2025/6/30
6	ISN	Schwarzbeck	NTFM8158	183	/	2025/6/30
7	Voltage sensor	Schwarzbeck	TK 9420	01189	/	2024/11/16
8	EZ-EMC	Frad	EMC-con3A1.1	/	/	/
9	Current Probe	FCC	F-52B	199453	/	2025/5/27
10	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/6/28
11	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/6/28

Radiated emission(No.1 Chamber)						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2027/6/21
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2025/7/06
3	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/29
4	Amplifier	Agilent	8449B	3008A01838	/	2025/6/30
5	Amplifier	HP	8447E	2945A02747	/	2025/6/28
6	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/29
7	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
8	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
9	Coaxial cable	ETS	RFC-SNS-100-NMS-80	/	/	2025/6/28
10	Coaxial cable	ETS	RFC-SN-100-NMS-20	/	/	2025/6/28
11	Coaxial cable	ETS	RFC-SNS-100-SMS-20	/	/	2025/6/28
12	Coaxial cable	ETS	RFC-NNS-100-NMS-300	/	/	2025/6/28

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13	EMI test software	Frad	EZ-EMC	Ver/ FA-03A2 RE	/	/
14	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/6/28
15	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/6/28

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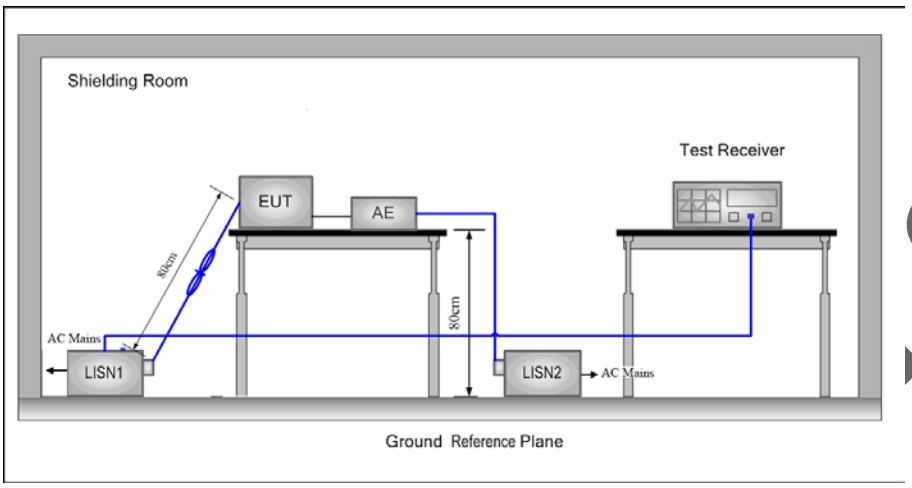
6. AC POWER LINE CONDUCTEDEMISSION

6.1 Block Diagram Of Test Setup



6.2 Limit

* Decreasing linearly with the logarithm of the frequency

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

6.3 Test procedure

1) The mains terminal disturbance voltage test was conducted in a shieldedroom.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. Thepower cables of all other units of the EUT were connected to a second LISN 2, which was bondedtothegroundreferenceplaneinthesamewayastheLISN1fortheunitbeing measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was notexceeded.

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 referenceplane,

4) Thetestwasperformedwithaverticalgroundreferenceplane.TherearoftheEUT 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 theboundaryof the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distancewas

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betweentheclosestpointsoftheLISN1andtheEUT.Allotherunitsof the EUT and associated equipment was at least 0,8 m from the LISN2.

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**.**

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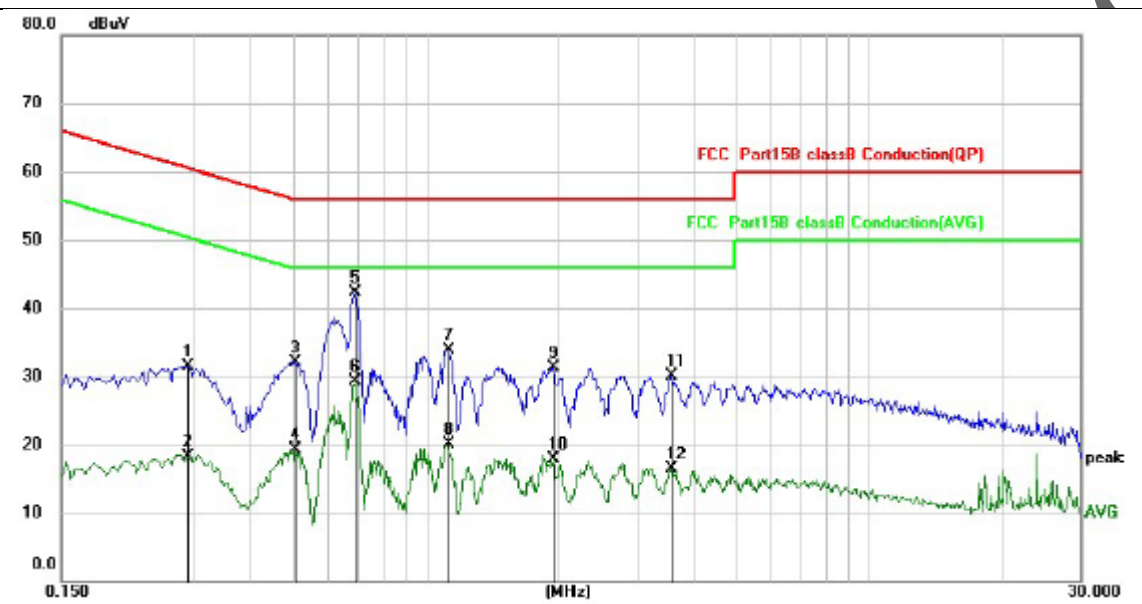
6.4 Test Result

Temperature:	23 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage:	AC 120V/60Hz	Test Mode:	Normal Link



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2900	20.89	10.65	31.54	60.52	-28.98	QP
2		0.2900	7.64	10.65	18.29	50.52	-32.23	AVG
3		0.5060	21.69	10.51	32.20	56.00	-23.80	QP
4		0.5060	8.77	10.51	19.28	46.00	-26.72	AVG
5	*	0.6900	31.67	10.71	42.38	56.00	-13.62	QP
6		0.6900	18.58	10.71	29.29	46.00	-16.71	AVG
7		1.1180	22.89	11.02	33.91	56.00	-22.09	QP
8		1.1180	9.05	11.02	20.07	46.00	-25.93	AVG
9		1.9340	19.74	11.54	31.28	56.00	-24.72	QP
10		1.9340	6.37	11.54	17.91	46.00	-28.09	AVG
11		3.5700	18.25	11.93	30.18	56.00	-25.82	QP
12		3.5700	4.58	11.93	16.51	46.00	-29.49	AVG

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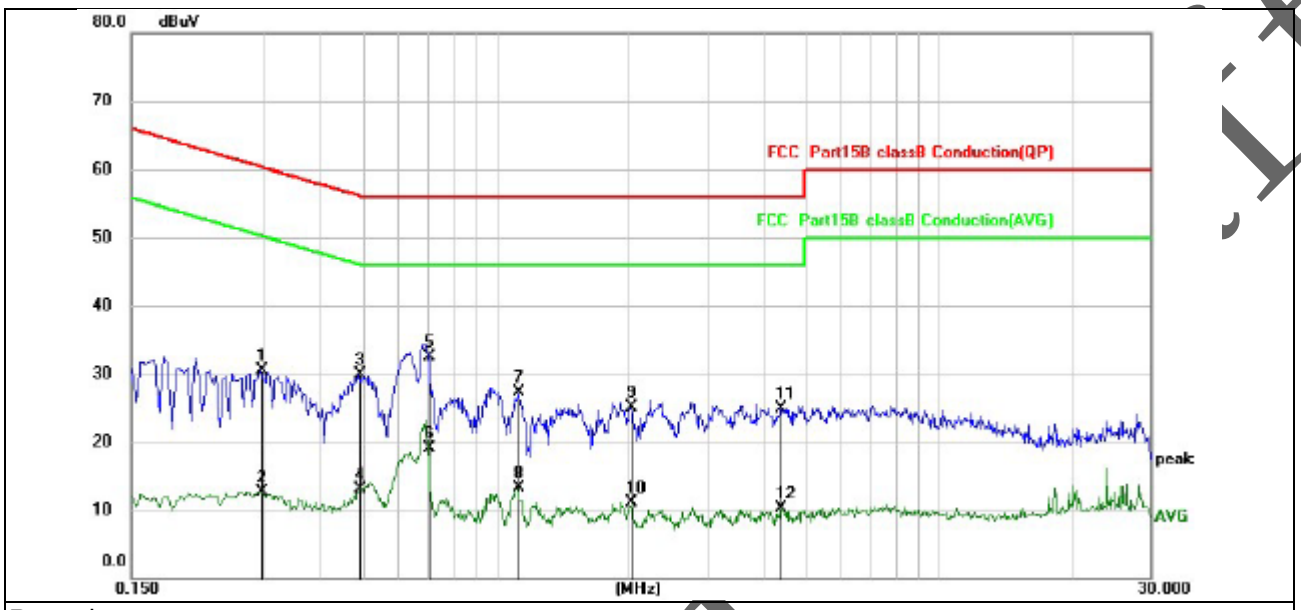
Temperature:	23℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage:	AC 120V/60Hz	Test Mode:	Normal Link



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2940	19.78	10.64	30.42	60.41	-29.99	QP
2		0.2940	2.09	10.64	12.73	50.41	-37.68	AVG
3		0.4900	19.34	10.51	29.85	56.17	-26.32	QP
4		0.4900	2.68	10.51	13.19	46.17	-32.98	AVG
5	*	0.7019	21.85	10.72	32.57	56.00	-23.43	QP
6		0.7019	8.32	10.72	19.04	46.00	-26.96	AVG
7		1.1260	16.21	11.03	27.24	56.00	-28.76	QP
8		1.1260	2.35	11.03	13.38	46.00	-32.62	AVG
9		2.0220	13.61	11.58	25.19	56.00	-30.81	QP
10		2.0220	-0.47	11.58	11.11	46.00	-34.89	AVG
11		4.4020	12.89	12.11	25.00	56.00	-31.00	QP
12		4.4020	-1.88	12.11	10.23	46.00	-35.77	AVG

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7. RADIATEDEMISSION

7.1 Block Diagram Of Test Setup

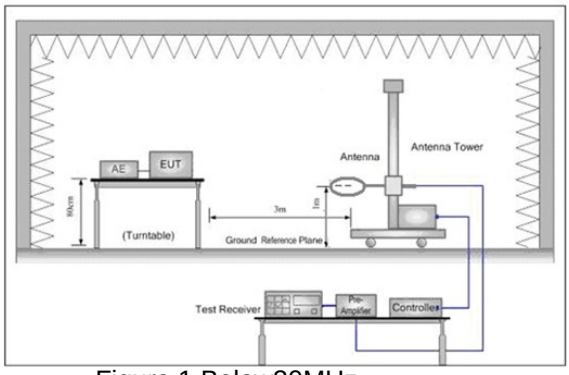

Figure 1.Below30MHz

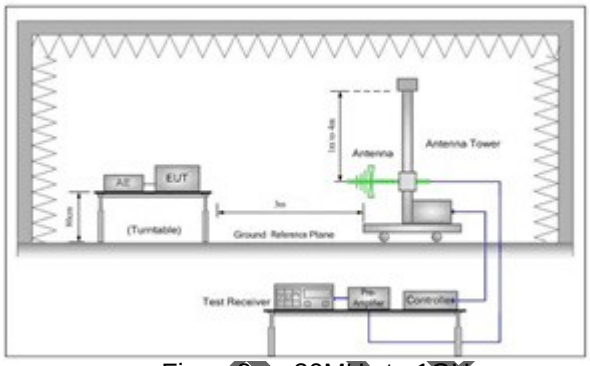

Figure2. 30MHz to 1GHz

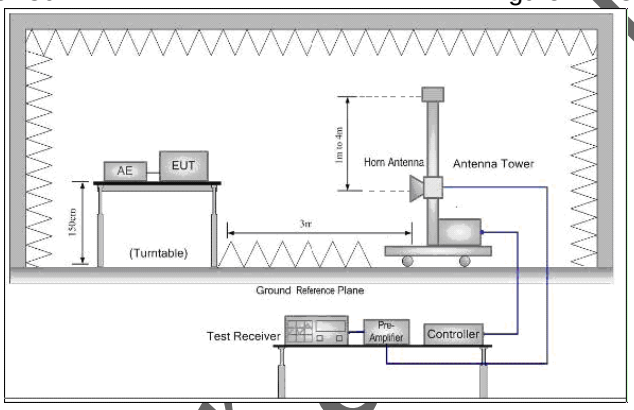

Figure 3. Above 1GHz

7.2 Limit

SpuriousEmissions:

Frequency	Field strength (dBµV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	20log 2400/F (kHz) + 80	Quasi-peak	3
0.490MHz-1.705MHz	20log 24000/F (kHz) + 40	Quasi-peak	3
1.705MHz-30MHz	20log 30 + 40	Quasi-peak	3
30MHz-88MHz	40.0	Quasi-peak	3
88MHz-216MHz	43.5	Quasi-peak	3
216MHz-960MHz	46.0	Quasi-peak	3
960MHz-1GHz	54.0	Quasi-peak	3
Above 1GHz	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximumpermittedaverageemissionlimitapplicabletotheequipmentundertest.Thispeaklimitappliestothe total peak emission level radiated by thedevice.

Field Strength of Fundamental Limit:

a. The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters. 15,848 microvolts/meter at 3 meters=124dBuV/m.

b. Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. 334 microvolts/meter at 3 meters=94.47dBuV/m.

c. Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shallnot

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exceed 334 microvolts/meter at 30 meters.

7.3 Testprocedure

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highestradiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antennatower.

c. 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.

d. 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 rota table table was turned from 0 degrees to 360 degrees to find the maximumreading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. 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 datasheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).

h. Test the EUT in the lowest channel ,the middle channel ,the Highestchannel

j. Repeat above procedures until all frequencies measured was complete.

Receiver set:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120 kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

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7.4 Test Result

Field Strength of Fundamental
ANT1:

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar (H/V)	Detector
13.37	47.46	15.82	63.28	80.51	-17.23	H	QP
13.36	45.73	15.82	61.55	80.51	-18.96	V	QP
13.92	46.32	15.82	62.14	80.51	-18.37	H	QP
13.94	49.23	15.82	65.05	80.51	-15.46	V	QP
13.58	57.51	15.61	73.12	90.47	-17.35	H	QP
13.59	58.55	15.61	74.16	90.47	-16.31	V	QP
13.56	88.77	12.33	101.10	124.00	-22.90	H	Peak
13.56	85.43	12.33	97.76	124.00	-26.24	V	Peak
13.59	56.83	12.33	69.16	90.47	-21.31	H	QP
13.60	57.23	12.33	69.56	90.47	-20.91	V	QP
13.44	46.76	15.82	62.58	80.50	-17.92	H	QP
13.43	44.85	15.82	60.67	80.50	-19.83	V	QP
13.75	43.36	15.82	59.18	80.50	-21.32	H	QP
13.71	45.42	15.82	61.24	80.50	-19.26	V	QP
13.49	53.90	15.82	69.72	90.47	-20.75	H	QP
13.49	52.30	15.82	68.12	90.47	-22.35	V	QP
13.71	51.33	15.82	67.15	90.47	-23.32	H	QP
13.68	49.12	15.82	64.94	90.47	-25.53	V	QP

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ANT2:

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar (H/V)	Detector
13.34	47.50	15.82	63.32	80.51	-17.19	H	QP
13.35	45.71	15.82	61.53	80.51	-18.98	V	QP
13.95	46.32	15.82	62.14	80.51	-18.37	H	QP
13.93	49.23	15.82	65.05	80.51	-15.46	V	QP
13.59	57.49	15.61	73.10	90.47	-17.37	H	QP
13.57	58.58	15.61	74.19	90.47	-16.28	V	QP
13.56	88.75	12.33	101.08	124.00	-22.92	H	Peak
13.56	85.42	12.33	97.75	124.00	-26.25	V	Peak
13.59	56.84	12.33	69.17	90.47	-21.30	H	QP
13.60	57.23	12.33	69.56	90.47	-20.91	V	QP
13.42	46.74	15.82	62.56	80.50	-17.94	H	QP
13.44	44.85	15.82	60.67	80.50	-19.83	V	QP
13.74	43.32	15.82	59.14	80.50	-21.36	H	QP
13.75	45.41	15.82	61.23	80.50	-19.27	V	QP
13.50	53.93	15.82	69.75	90.47	-20.72	H	QP
13.47	52.31	15.82	68.13	90.47	-22.34	V	QP
13.69	51.31	15.82	67.13	90.47	-23.34	H	QP
13.69	49.14	15.82	64.96	90.47	-25.51	V	QP

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ANT3:

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar (H/V)	Detector
13.36	47.47	15.82	63.29	80.51	-17.22	H	QP
13.34	45.71	15.82	61.53	80.51	-18.98	V	QP
13.95	46.31	15.82	62.13	80.51	-18.38	H	QP
13.93	49.19	15.82	65.01	80.51	-15.50	V	QP
13.58	57.49	15.61	73.10	90.47	-17.37	H	QP
13.58	58.55	15.61	74.16	90.47	-16.31	V	QP
13.56	88.75	12.33	101.08	124.00	-22.92	H	Peak
13.56	85.43	12.33	97.76	124.00	-26.24	V	Peak
13.58	56.83	12.33	69.16	90.47	-21.31	H	QP
13.60	57.19	12.33	69.52	90.47	-20.95	V	QP
13.45	46.74	15.82	62.56	80.50	-17.94	H	QP
13.42	44.84	15.82	60.66	80.50	-19.84	V	QP
13.75	43.32	15.82	59.14	80.50	-21.36	H	QP
13.72	45.40	15.82	61.22	80.50	-19.28	V	QP
13.51	53.90	15.82	69.72	90.47	-20.75	H	QP
13.50	52.28	15.82	68.10	90.47	-22.37	V	QP
13.71	51.31	15.82	67.13	90.47	-23.34	H	QP
13.71	49.10	15.82	64.92	90.47	-25.55	V	QP

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ANT4:

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar (H/V)	Detector
13.38	47.49	15.82	63.31	80.51	-17.20	H	QP
13.33	45.73	15.82	61.55	80.51	-18.96	V	QP
13.95	46.31	15.82	62.13	80.51	-18.38	H	QP
13.94	49.22	15.82	65.04	80.51	-15.47	V	QP
13.58	57.50	15.61	73.11	90.47	-17.36	H	QP
13.59	58.60	15.61	74.21	90.47	-16.26	V	QP
13.56	88.77	12.33	101.10	124.00	-22.90	H	Peak
13.56	85.41	12.33	97.74	124.00	-26.26	V	Peak
13.61	56.81	12.33	69.14	90.47	-21.33	H	QP
13.57	57.19	12.33	69.52	90.47	-20.95	V	QP
13.46	46.77	15.82	62.59	80.50	-17.91	H	QP
13.42	44.84	15.82	60.66	80.50	-19.84	V	QP
13.76	43.33	15.82	59.15	80.50	-21.35	H	QP
13.75	45.43	15.82	61.25	80.50	-19.25	V	QP
13.50	53.90	15.82	69.72	90.47	-20.75	H	QP
13.51	52.32	15.82	68.14	90.47	-22.33	V	QP
13.70	51.35	15.82	67.17	90.47	-23.30	H	QP
13.71	49.09	15.82	64.91	90.47	-25.56	V	QP

Note: Among the 22 antennas recorded in the report, the test data of ANT9 is the worst.

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Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
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--	--	--
--	--	--
--	--	--

Note: *1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor*

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

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About 30MHz-1GHz Test Results:

Antenna polarity: H
All antennas are tested, (Worst case-ANT3)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		31.3442	31.54	-6.27	25.27	40.00	-14.73	QP
2		64.8863	31.15	-7.99	23.16	40.00	-16.84	QP
3		106.9458	35.76	-7.90	27.86	43.50	-15.64	QP
4		161.4738	33.53	-1.01	32.52	43.50	-10.98	QP
5	*	237.4755	41.25	-4.06	37.19	46.00	-8.81	QP
6		710.4266	28.90	5.61	34.51	46.00	-11.49	QP

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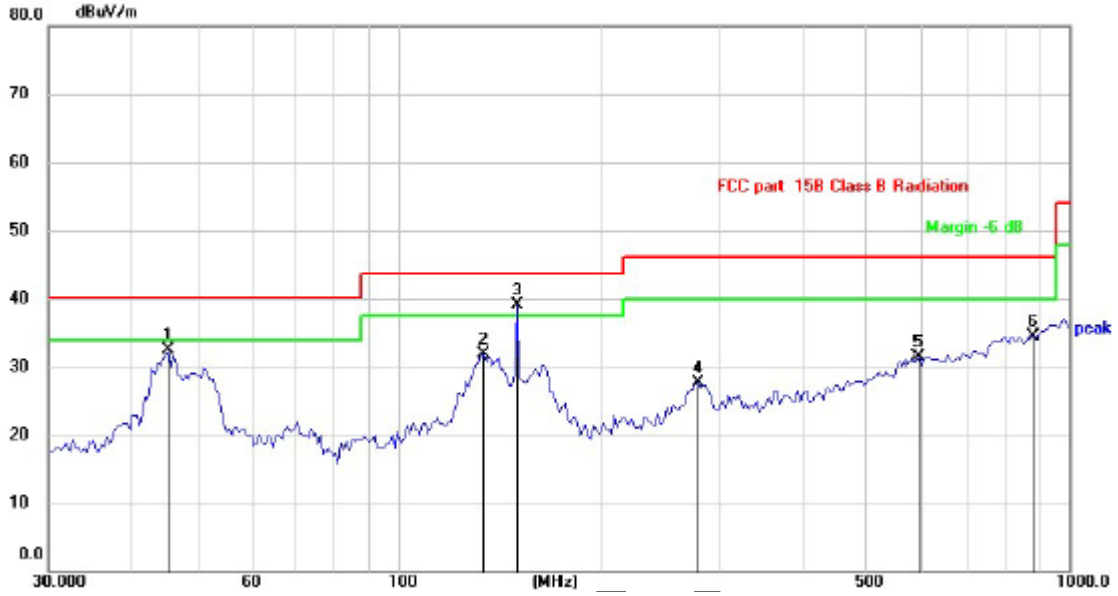
Antenna polarity: V

All antennas are tested, (Worst case-ANT3)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		45.2959	39.30	-6.75	32.55	40.00	-7.45	QP
2		134.3232	36.85	-4.92	31.93	43.50	-11.57	QP
3	*	150.5377	41.78	-2.75	39.03	43.50	-4.47	QP
4		280.5151	30.91	-3.25	27.66	46.00	-18.34	QP
5		596.1770	28.08	3.51	31.59	46.00	-14.41	QP
6		884.5027	26.44	8.13	34.57	46.00	-11.43	QP

Remark: 1. Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level
2. This EUT was tested in 3 axis and the worst case position data was reported.

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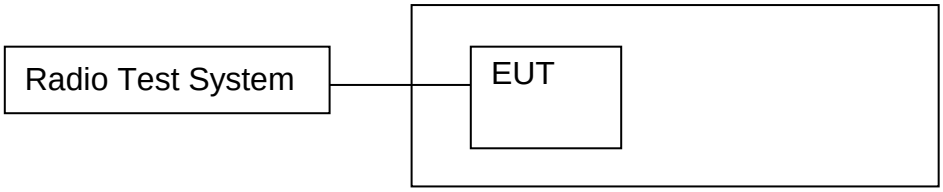
8. FREQUENCYTOLERANCE

8.1 Block Diagram Of Test Setup



8.2 Limit

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Limit: ±0.01% of 13.56MHz=±1356Hz

8.3 Test procedure

1. Set RBW = 10kHz.
2. Set the video bandwidth (VBW)≥RBW.
3. Detector = Peak.
4. Trace mode = maxhold.
5. Sweep = autocouple.
6. Allow the trace tostabilize.
7. The transmitter output (antenna port) was connected to the spectrumanalyzer.

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8.4 Test Result

ANT1:

Test Conditions			Frequency Deviation		Limit
Frequency MHz	Power(Vdc)	Temperature (℃)	Measured Freq. (MHz)	Deviation (%)	
13.56	Normal	-20	13.5603	0.0025	±0.01%
	Normal	-10	13.5603	0.0025	
	Normal	0	13.5602	0.0017	
	Normal	10	13.5606	0.0042	
	Normal	20	13.5602	0.0018	
	Normal	30	13.5604	0.0033	
	Normal	40	13.5603	0.0019	
	Normal	50	13.5604	0.0027	
	Normal*85%	20	13.5603	0.0019	
	Normal *115%	20	13.5604	0.0031	

ANT2:

Test Conditions			Frequency Deviation		Limit
Frequency MHz	Power(Vdc)	Temperature (℃)	Measured Freq. (MHz)	Deviation (%)	
13.56	Normal	-20	13.5603	0.0021	±0.01%
	Normal	-10	13.5604	0.0030	
	Normal	0	13.5602	0.0013	
	Normal	10	13.5605	0.0040	
	Normal	20	13.5603	0.0019	
	Normal	30	13.5604	0.0033	
	Normal	40	13.5602	0.0016	
	Normal	50	13.5604	0.0028	
	Normal*85%	20	13.5603	0.0019	
	Normal *115%	20	13.5604	0.0031	

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ANT3:

Test Conditions			Frequency Deviation		Limit
Frequency MHz	Power(Vdc)	Temperature (℃)	Measured Freq. (MHz)	Deviation (%)	
13.56	Normal	-20	13.5603	0.0021	±0.01%
	Normal	-10	13.5604	0.0029	
	Normal	0	13.5602	0.0014	
	Normal	10	13.5605	0.0040	
	Normal	20	13.5603	0.0022	
	Normal	30	13.5604	0.0032	
	Normal	40	13.5603	0.0019	
	Normal	50	13.5604	0.0032	
	Normal*85%	20	13.5602	0.0017	
	Normal *115%	20	13.5604	0.0028	

ANT4:

Test Conditions			Frequency Deviation		Limit
Frequency MHz	Power(Vdc)	Temperature (℃)	Measured Freq. (MHz)	Deviation (%)	
13.56	Normal	-20	13.5603	0.0023	±0.01%
	Normal	-10	13.5604	0.0027	
	Normal	0	13.5602	0.0014	
	Normal	10	13.5606	0.0042	
	Normal	20	13.5603	0.0021	
	Normal	30	13.5605	0.0035	
	Normal	40	13.5602	0.0017	
	Normal	50	13.5604	0.0030	
	Normal*85%	20	13.5603	0.0021	
	Normal *115%	20	13.5604	0.0030	

Note: Among the 22 antennas recorded in the report, the test data of ANT9 is the worst.

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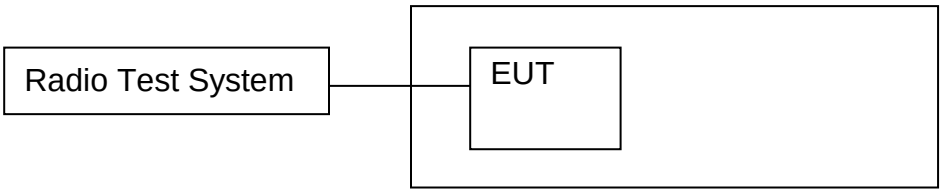
9. OCCUPIEDBANDWIDTH

9.1 Block Diagram Of Test Setup



9.2 Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be.deomonstrated by measuring the radiated emissions.

9.3 Test procedure

1. Set RBW = 1kHz.
2. Set the video bandwidth (VBW)≥RBW.
3. Detector = Peak.
4. Trace mode = maxhold.
5. Sweep = autocouple.
6. Allow the trace tostabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamentalemission.

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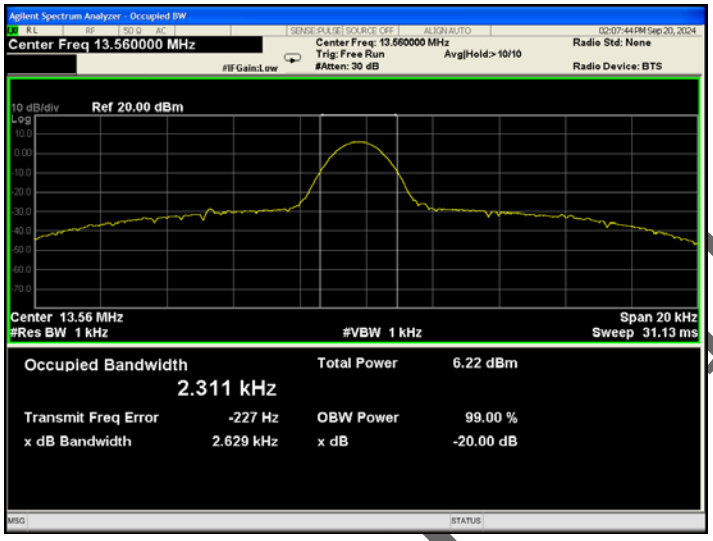
9.4 Test Result

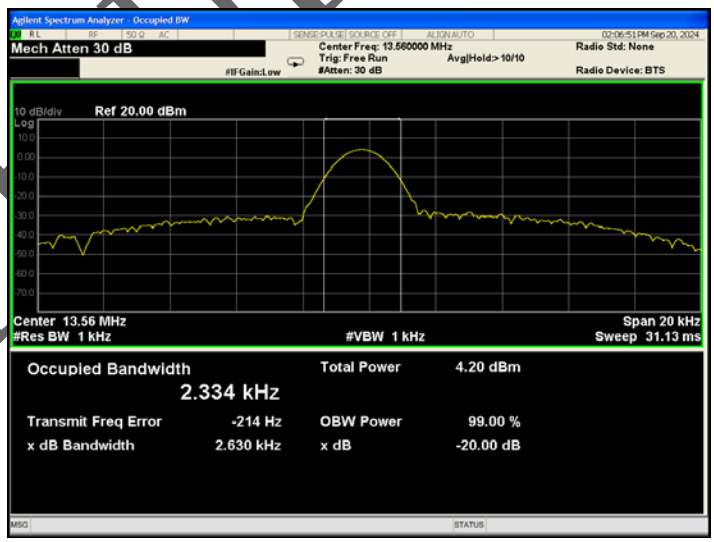
ANT1:

Test Channel (MHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
13.56	2.629	N/A	PASS



ANT2:

Test Channel (MHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
13.56	2.630	N/A	PASS



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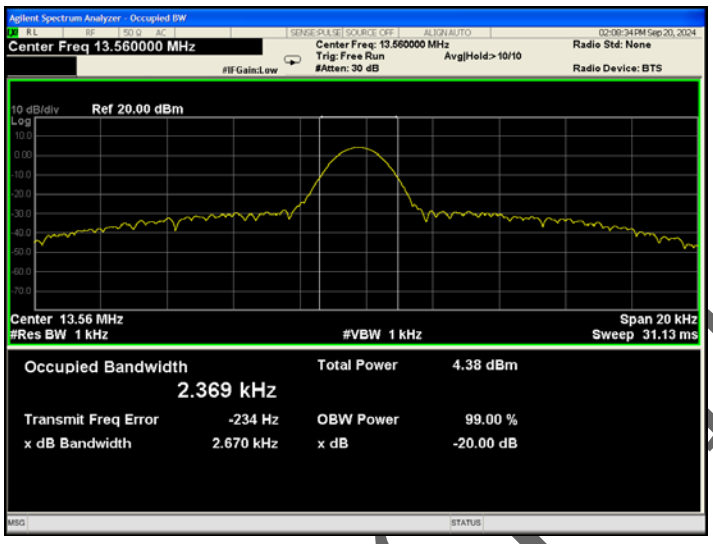
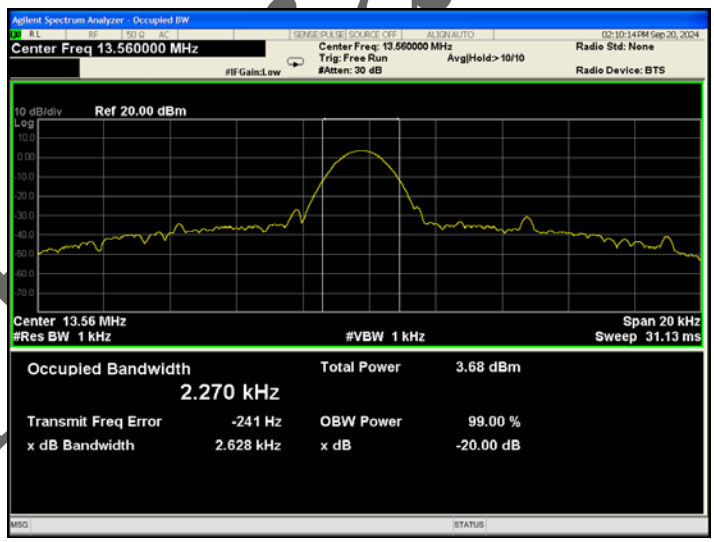
ANT3:

Test Channel (MHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
13.56	2.670	N/A	PASS



ANT4:

Test Channel (MHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
13.56	2.628	N/A	PASS



Note: Among the 22 antennas recorded in the report, the test data of ANT9 is the worst.

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10. ANTENNAREQUIREMENT

15.203 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 permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 PCB antenna and no consideration of replacement. The best case gain of the antenna is 1.0dBi.

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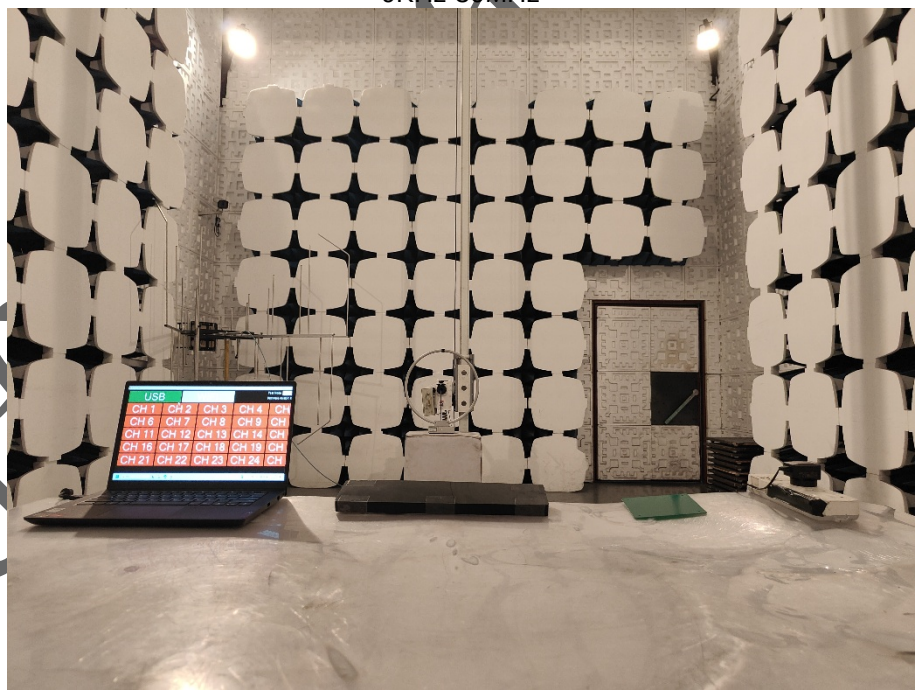
11. EUT TEST SETUPPHOTOGRAPHS

Radiated Emission

30M-1GHz

9KHz-30MHz



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Conducted emission

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