Test Report

FCC PART 15 SUBPART C 15.247

Test report

On Behalf of

Shenzhen CTV Int Cloud Technology Co., Ltd

For

Security Camera

Model No.: ZY-BB1, ZY-BB2, ZY-BB3, ZY-BB4, ZY-BB5, ZY-BB6, Baby1, Baby 2, Baby 3, Baby 4, ZY-BY1, ZY-BY2, ZY-BY3, ZY-BY4, ZY-BY5, ZY-BY6, ZY-BY7, ZY-BY8, ZY-BY9, ZY-BB7, ZY-BB8, ZY-BB9, ZY-BB10, Baby 5, Baby 6, Baby 7, Baby 8, Baby 9, Baby 10

FCC ID: 2AZL7-ZY-BB1

Prepared For :	**Shenzhen CTV Int Cloud Technology Co., Ltd** **501, Building A, Debaoli Industrial Park, Shangxue Technology City, Xinxue Community, Bantian Street, Longgang District, Shenzhen, China**
Prepared By :	**Shenzhen DL Testing Technology Co., Ltd.** **101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China**
Date of Test:	**Apr. 08, 2024 ~ May 22, 2024**
Date of Report:	**May 22, 2024**
Report Number:	**DL-240606008-1ER**

Test Result Certification

Applicant's Name .....:	Shenzhen CTV Int Cloud Technology Co., Ltd
Address .....:	501, Building A, Debaoli Industrial Park, Shangxue Technology City, Xinxue Community, Bantian Street, Longgang District, Shenzhen, China
Manufacturer's Name.....:	Shenzhen CTV Int Cloud Technology Co., Ltd
Address .....:	501, Building A, Debaoli Industrial Park, Shangxue Technology City, Xinxue Community, Bantian Street, Longgang District, Shenzhen, China

Product description

Trade Mark:	N/A
Product name .....:	Security Camera
Model and/or type reference ...:	ZY-BB1, ZY-BB2, ZY-BB3, ZY-BB4, ZY-BB5, ZY-BB6, Baby1, Baby 2, Baby 3, Baby 4, ZY-BY1, ZY-BY2, ZY-BY3, ZY-BY4, ZY-BY5, ZY-BY6, ZY-BY7, ZY-BY8, ZY-BY9, ZY-BB7, ZY-BB8, ZY-BB9, ZY-BB10, Baby 5, Baby 6, Baby 7, Baby 8, Baby 9, Baby 10
Standards.....:	**47 CFR FCC Part 15 Subpart C 15.247**

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Date of Test..... :	
Date (s) of performance of tests ..... :	**Apr. 08, 2024 ~ May 22, 2024**
Date of Issue ..... :	**May 22, 2024**
Test Result ..... :	**Pass**

Testing Engineer	:	Randy Xie
Technical Manager	:	Jack Bu
Authorized Signatory	:	Jade Yang

Randy Xie

Jack Bu

Jade Yang

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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	May 22, 2024	

1 Test Summary

1.1 Test Description

Test Item	Test Requirement	Result
Antenna Requirement	§15.203/§15.247(b)(4)	PASS
Conducted Emission	FCC Part 15.207	PASS
Radiated Emissions	FCC Part 15.205/15.209	PASS
Maximum Peak Output Power	FCC Part 15.247(b)	PASS
Power Spectral Density	FCC Part 15.247 (e)	PASS
6dB Bandwidth & 99% Bandwidth	FCC Part 15.247(a)(2)	PASS
Spurious RF Conducted Emission	FCC Part 15.247(d)	PASS
Band Edge	FCC Part 15.247(d)	PASS

1.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties. The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the DL quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. The maximum value of the uncertainty as below:

Measurement Uncertainty		
Conducted Emission Expanded Uncertainty	=	2.71dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.90dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	3.90dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.28dB, k=2

2 Information of The Test Laboratory

Shenzhen DL Testing Technology Co., Ltd.
Add.: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：
FCC Test Firm Registration Number: 854456
Designation Number: CN1307
IC Registered No.: 27485
CAB ID.: CN0118

3 General Information

3.1 General Description of EUT

EUT Name:	Security Camera.
Model No:	ZY-BB1
Series Model:	ZY-BB2, ZY-BB3, ZY-BB4, ZY-BB5, ZY-BB6, Baby1, Baby 2, Baby 3, Baby 4, ZY-BY1, ZY-BY2, ZY-BY3, ZY-BY4, ZY-BY5, ZY-BY6, ZY-BY7, ZY-BY8, ZY-BY9, ZY-BB7, ZY-BB8, ZY-BB9, ZY-BB10, Baby 5, Baby 6, Baby 7, Baby 8, Baby 9, Baby 10
Model Difference:	All model's the function, software and electric circuit are the same, only with a product color, appearance and model named different. Test sample model: ZY-BB1
Trade Mark:	N/A
Operation frequency:	905-925MHz
Modulation Technology:	OFDM
Hardware Version:	V1.0
Software Version:	V1.0
Antenna Type:	FPC Antenna
Antenna Gain:	4.02dBi
Power Supply:	DC 5V 1A from Adapter
Note:	
1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. Antenna gain Refer to the antenna specifications. 3. The cable loss data is obtained from the supplier. 4. The test results in the report only apply to the tested sample.	

3.2 Carrier Frequency of Channels

Description of Channel:					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	905	6	915	11	925
2	907	7	917	12	
3	909	8	919	13	
4	911	9	921	14	
5	913	10	923	15	

3.3 Operation of EUT During Testing

Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 905MHz

Middle Channel: 915MHz

High Channel: 925MHz

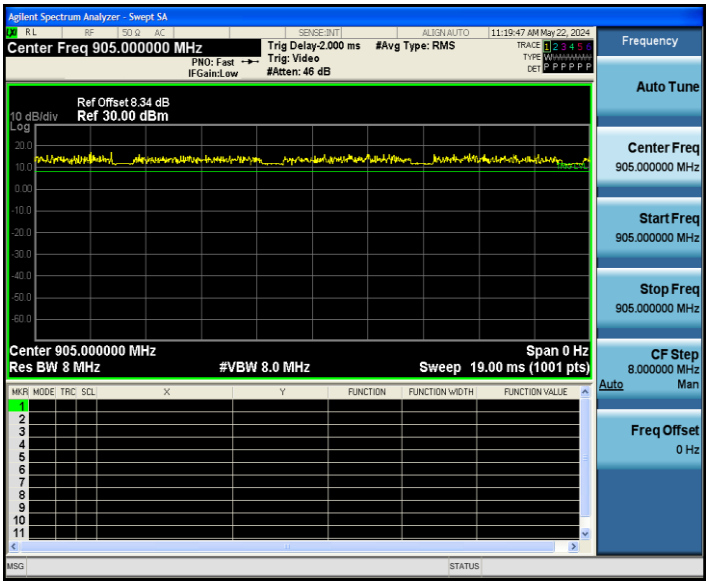
3.4 Description of Test Conditions

(1) E.U.T. test conditions:
For intentional radiators, measurements of the variation of the input power or the adiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

(2) Frequency range of radiated measurements:
The test range will be up to the tenth harmonic of the highest fundamental frequency.

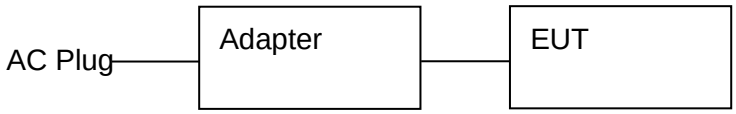
(3) Pre-test the EUT in all transmitting mode at the lowest (905 MHz), middle (915 MHz) and highest (925 MHz) channel with different data packet and conducted to determine the worst-case mode, only the worst-case results are recorded in this report.

(1) The duty cycle is 100%.



3.5 Description of Test Setup

Operation of EUT during Conducted testing and Radiation testing:



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. The worst case is X position.

3.6 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Note
1	Security Camera	N/A	ZY-BB1	N/A	EUT
2	USB Cable	N/A	N/A	Length: 1.5m	Accessory
3	Adapter	N/A	SA0051-0501000US	Input: AC100-240V, 50/60Hz, 0.2A Output: DC5V/1A, 5W	Accessory

Note:

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.*
3. *For conducted measurements (Output Power, 6Db Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.*

4 Equipments List for All Test Items

Radiation test, Band-edge test and 20db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 04, 2023	Nov. 03, 2024
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 04, 2023	Nov. 03, 2024
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 04, 2023	Nov. 03, 2024
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 04, 2023	Nov. 03, 2024
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 04, 2023	Nov. 03, 2024
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 04, 2023	Nov. 03, 2024
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 04, 2023	Nov. 03, 2024
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 04, 2023	Nov. 03, 2024
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 04, 2023	Nov. 03, 2024
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 04, 2023	Nov. 03, 2024
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 04, 2023	Nov. 03, 2024
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 04, 2023	Nov. 03, 2024
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 04, 2023	Nov. 03, 2024
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Nov. 04, 2023	Nov. 03, 2024
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Nov. 04, 2023	Nov. 03, 2024
16	D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 04, 2023	Nov. 03, 2024

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Sep. 20, 2022	Sep. 19, 2025
2	EMI Receiver	R&S	ESR	101421	Nov. 04, 2023	Nov. 03, 2024
3	LISN	R&S	ENV216	102417	Nov. 04, 2023	Nov. 03, 2024
4	843 Cable 1#	ChengYu	CE Cable	001	Nov. 04, 2023	Nov. 03, 2024
5	10dB Attenuator	Schwarzbeck	VTSD9561F	00154	Nov. 04, 2023	Nov. 03, 2024

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0

5 Test Result

5.1 Antenna Requirement

5.1.1 Standard Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

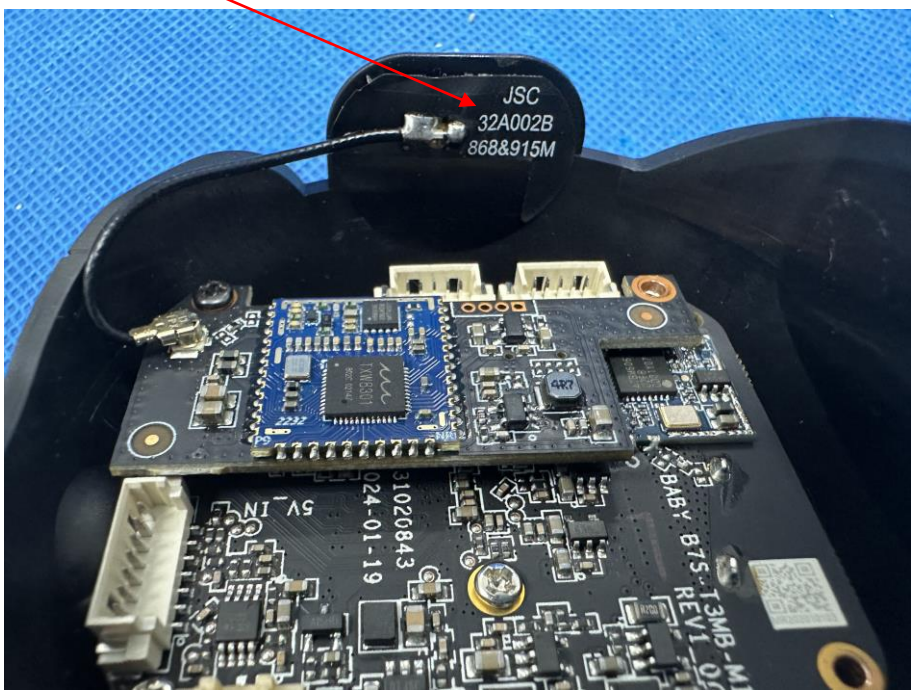
Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a FPC antenna, need professional installation, not easy to remove. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 4.02dBi.

5.1.2 EUT Antenna



5.2 Conduction Emissions Measurement

5.2.1 Applied Procedures / Limit

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207, AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus as below:

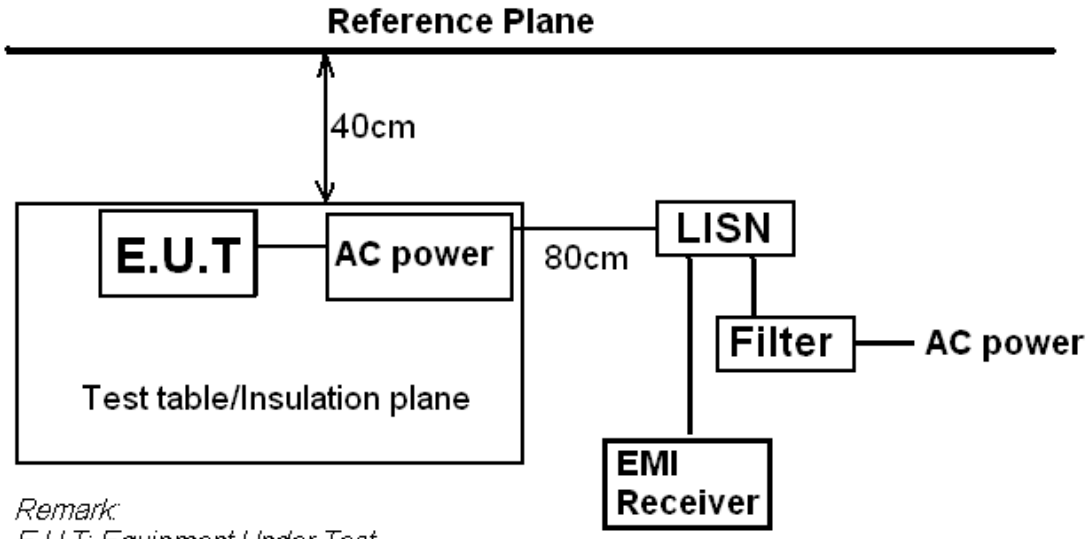
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

5.2.2 Test Procedure

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

5.2.3 Test Setup

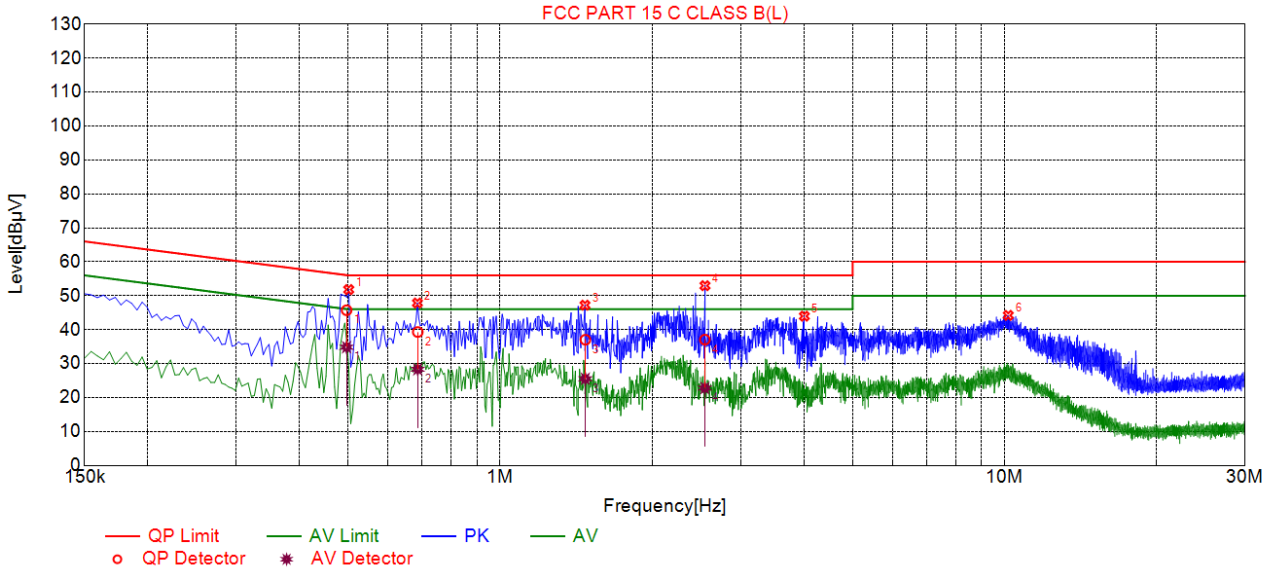


Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

5.2.4 Test Results

PASS

Test Specification: Line



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.5010	51.82	20.04	56.00	4.18	31.78	PK	L
2	0.6855	47.86	20.05	56.00	8.14	27.81	PK	L
3	1.4730	47.22	20.10	56.00	8.78	27.12	PK	L
4	2.5485	52.96	20.20	56.00	3.04	32.76	PK	L
5	4.0110	43.97	20.25	56.00	12.03	23.72	PK	L
6	10.1760	44.21	20.06	60.00	15.79	24.15	PK	L

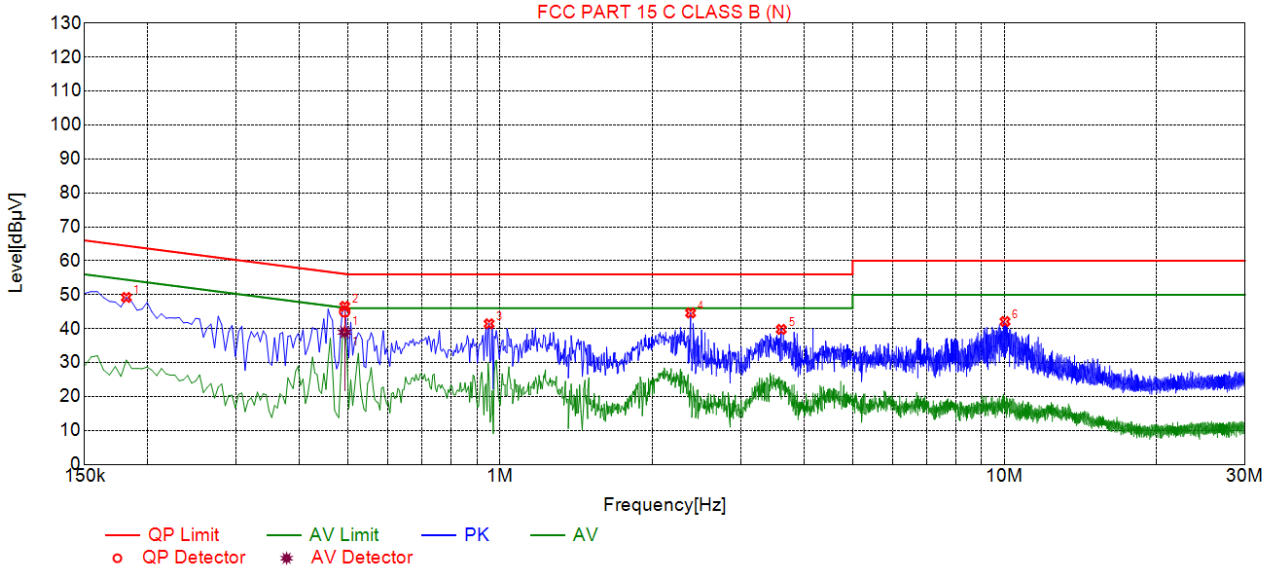
Final Data List											
NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	QP Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	AV Reading [dBµV]	Type
1	0.4960	20.04	45.74	56.07	10.33	25.70	34.84	46.07	11.23	14.80	L
2	0.6864	20.05	39.31	56.00	16.69	19.26	28.33	46.00	17.67	8.28	L
3	1.4754	20.10	37.04	56.00	18.96	16.94	25.53	46.00	20.47	5.43	L
4	2.5462	20.20	37.07	56.00	18.93	16.87	22.80	46.00	23.20	2.60	L

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

Test Specification: Neutral



Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1815	49.20	20.06	64.42	15.22	29.14	PK	N
2	0.4920	46.59	20.04	56.13	9.54	26.55	PK	N
3	0.9510	41.44	20.06	56.00	14.56	21.38	PK	N
4	2.3865	44.62	20.18	56.00	11.38	24.44	PK	N
5	3.6105	39.79	20.25	56.00	16.21	19.54	PK	N
6	10.0275	42.10	20.06	60.00	17.90	22.04	PK	N

Final Data List											
NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	QP Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	AV Reading [dBμV]	Type
1	0.4917	20.04	45.02	56.14	11.12	24.98	38.96	46.14	7.18	18.92	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

5.3 Radiated Emissions Measurement

5.3.1 Applied Procedures / Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

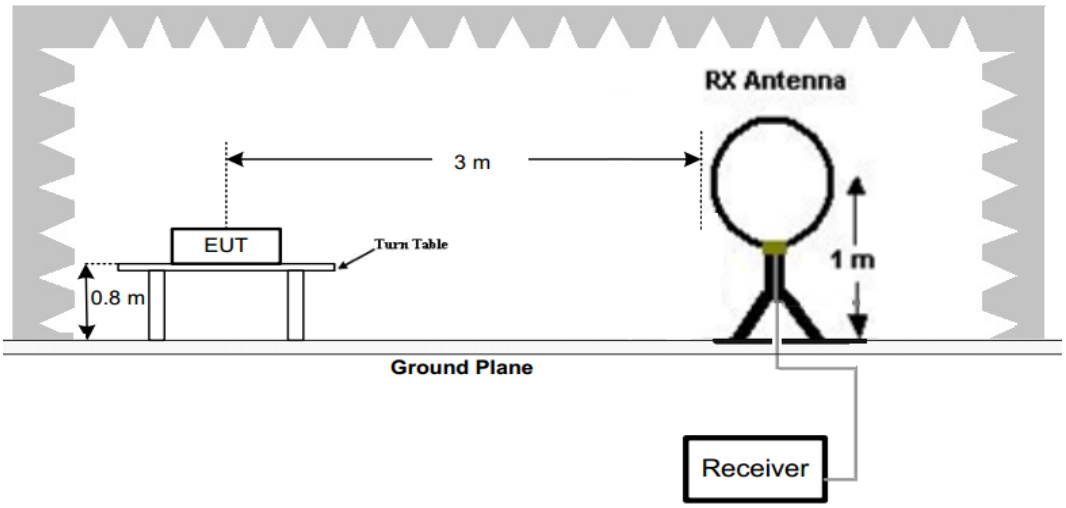
Radiated emission limits

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

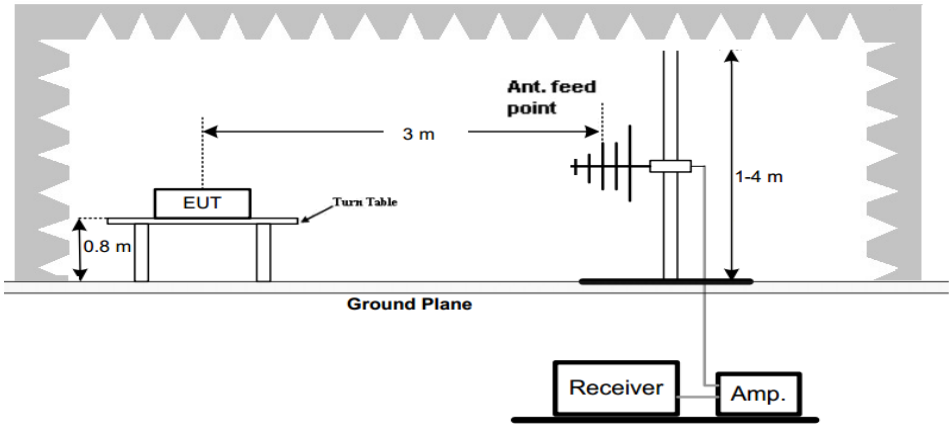
5.3.2 Test Setup

Test Configuration:

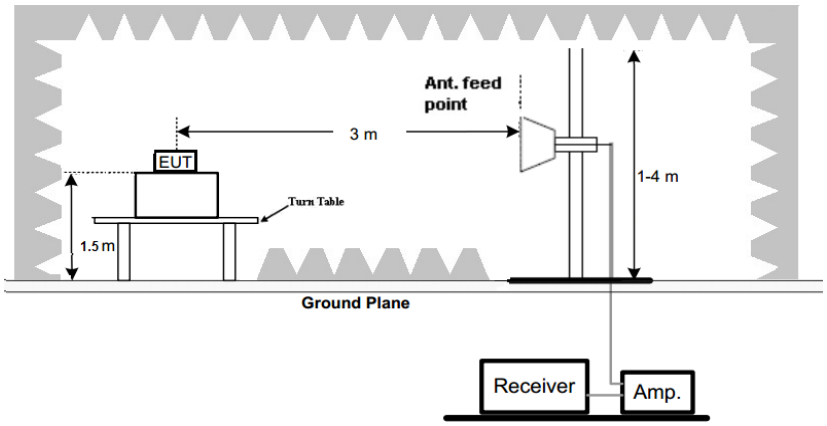
1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 25 GHz emissions:



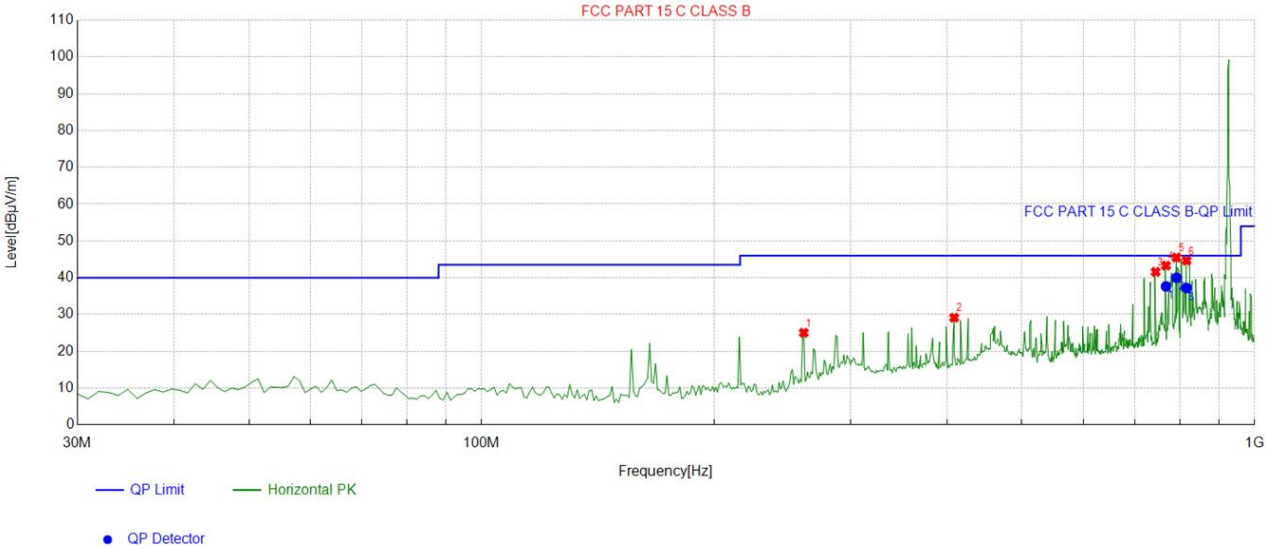
Test Procedure

1. The EUT was placed on turn table which is 0.8m above ground plane for below 1GHz test, and on a low permittivity and low loss tangent turn table which is 1.5m above ground plane for above 1GHz test.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

5.3.3 Test Result

Below 1GHz Test Results:

Antenna polarity: H

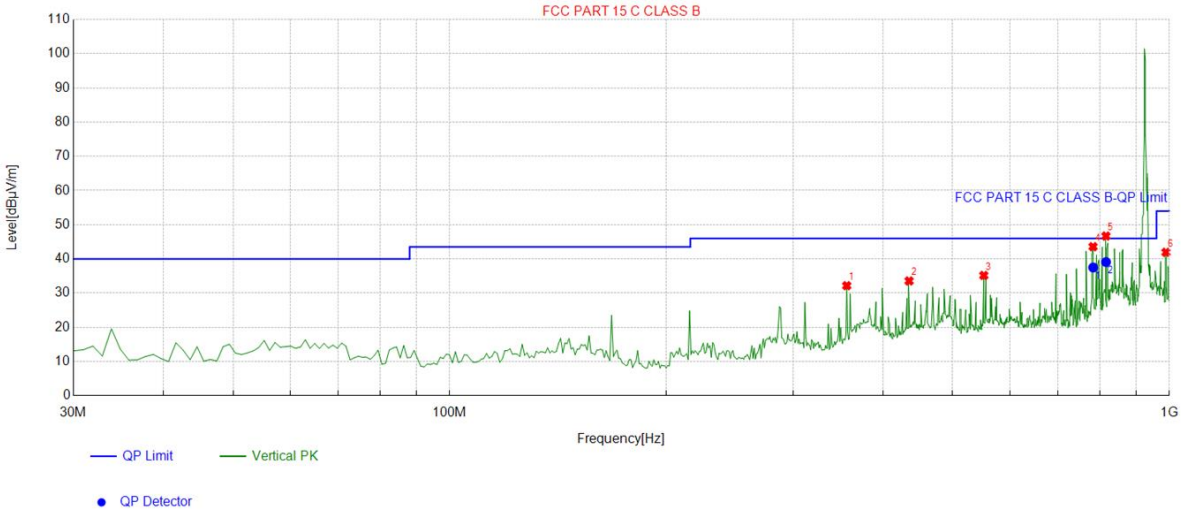


Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	261.09109	-13.28	38.30	25.02	46.00	20.98	100	58	Horizontal
2	408.67867	-9.67	38.82	29.15	46.00	16.85	100	162	Horizontal
3	744.63463	-3.42	44.99	41.57	46.00	4.43	100	16	Horizontal
4	767.93793	-4.54	47.83	43.29	46.00	2.71	100	54	Horizontal
5	792.21221	-3.25	48.72	45.47	46.00	0.53	100	0	Horizontal
6	816.48648	-3.07	47.71	44.64	46.00	1.36	100	129	Horizontal

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	767.9379	-4.54	42.18	37.64	46.00	8.36	100	54	Horizontal
2	792.2122	-3.25	43.24	39.99	46.00	6.01	100	0	Horizontal
3	816.4864	-3.07	40.27	37.20	46.00	8.80	100	129	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.

Antenna polarity: V



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	356.24624	-10.15	42.32	32.17	46.00	13.83	100	338	Vertical
2	434.89489	-9.04	42.59	33.55	46.00	12.45	100	230	Vertical
3	552.38238	-6.88	42.04	35.16	46.00	10.84	100	209	Vertical
4	783.47347	-3.77	47.34	43.57	46.00	2.43	100	230	Vertical
5	816.48648	-3.07	49.75	46.68	46.00	-0.68	100	242	Vertical
6	989.31931	-0.41	42.34	41.93	54.00	12.07	100	234	Vertical

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Reading [dBµV/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	783.4734	-3.77	41.26	37.49	46.00	8.51	100	230	Vertical
2	816.4864	-3.07	42.16	39.09	46.00	6.91	100	242	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

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

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

For 1GHz to 25GHz

CH Low (905MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1810	55.15	-3.64	51.51	74	-22.49	peak
1810	41.95	-3.64	38.31	54	-15.69	AVG
2715	53.28	-0.95	52.33	74	-21.67	peak
2715	39.06	-0.95	38.11	54	-15.89	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1810	52.84	-3.64	49.2	74	-24.8	peak
1810	43.52	-3.64	39.88	54	-14.12	AVG
2715	50.69	-0.95	49.74	74	-24.26	peak
2715	40.30	-0.95	39.35	54	-14.65	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

CH Middle (915MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1830	52.17	-3.51	48.66	74	-25.34	peak
1830	45.38	-3.51	41.87	54	-12.13	AVG
2745	51.08	-0.82	50.26	74	-23.74	peak
2745	42.33	-0.82	41.51	54	-12.49	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1830	53.64	-3.51	50.13	74	-23.87	peak
1830	44.38	-3.51	40.87	54	-13.13	AVG
2745	51.64	-0.82	50.82	74	-23.18	peak
2745	41.05	-0.82	40.23	54	-13.77	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

CH High (925MHz)

Horizontal:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1850	56.36	-3.43	52.93	74	-21.07	peak
1850	45.71	-3.43	42.28	54	-11.72	AVG
2775	53.69	-0.75	52.94	74	-21.06	peak
2775	46.02	-0.75	45.27	54	-8.73	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
1850	55.77	-3.43	52.34	74	-21.66	peak
1850	42.38	-3.43	38.95	54	-15.05	AVG
2775	53.06	-0.75	52.31	74	-21.69	peak
2775	39.17	-0.75	38.42	54	-15.58	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency; “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4)The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
(7) All modes of operation were investigated and the worst-case emissions are reported.

Band Edge Requirement:

Frequency (MHz)	Ant. Pol.	PK Reading (dBμV)	AV Reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin Peak(dB)
					Peak (dBμV/m)	AV (dBμV/m)			
902	H	55.32	---	-3.8	51.52	---	74	---	-22.48
902	H	55.03	---	-3.7	51.33	---	74	---	-22.67
928	V	54.66	---	-3.8	50.86	---	74	---	-23.14
928	V	53.19	---	-4.3	48.89	---	74	---	-25.11

Note:
1. Emission Level = Peak Reading + Correction Factor; Correction Factor = Antenna Factor + Cable loss – Pre-amplifier
2. Margin = Emission - Limit
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “---“ in the above table mean that the reading of emissions is attenuated more than 20dB below the limits or the field strength is too small to be measured.

5.4 Maximum Output Power Measurement

5.4.1 Limit

The Maximum Peak Output Power Measurement is 30dBm.

5.4.2 Test Procedure

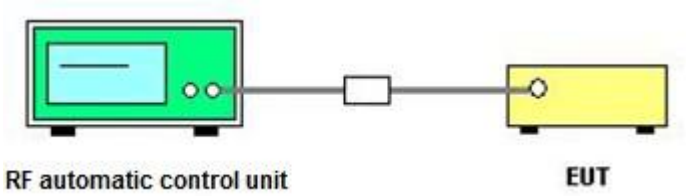
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

The maximum Average conducted output power may be measured using a wideband RF power meter with a thermocouple derector or equivalent. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

5.4.3 Deviation from Standard

No deviation.

5.4.4 Test Setup



5.4.5 Test Results

Channel	Channel frequency (MHz)	Output power (dBm)	Limit (dBm)	Result
Low	905	26.03	30	Pass
Middle	915	25.7		Pass
High	925	26.12		Pass

5.5 Power Spectral Density

5.5.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

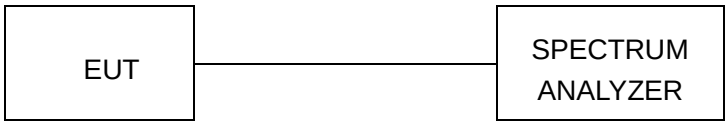
5.5.2 Test Procedure

Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
Set the RBW =3 kHz.
Set the VBW =10 KHz.
Set the span to 1.5 times the DTS channel bandwidth.
Detector = peak.
Sweep time = auto couple.
Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum power level.
If measured value exceeds limit, reduce RBW(no less than 3 kHz)and repeat.
The resulting peak PSD level must be 8 dBm.

5.5.3 Deviation from Standard

No deviation.

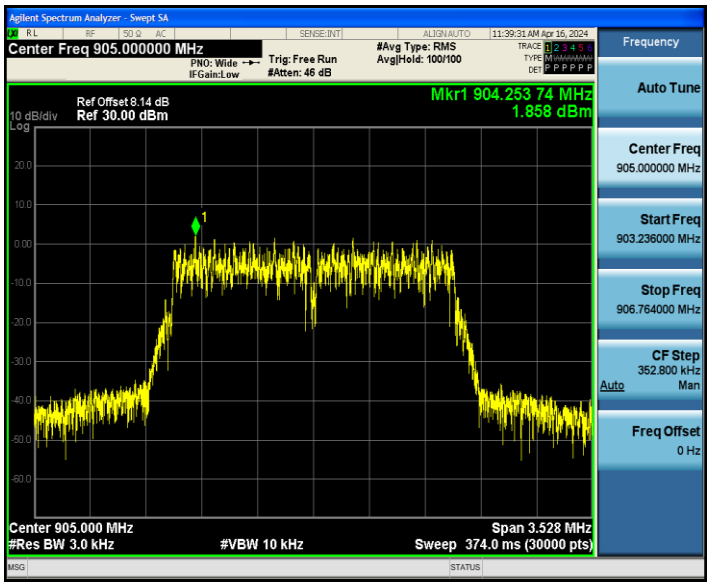
5.5.4 Test Setup



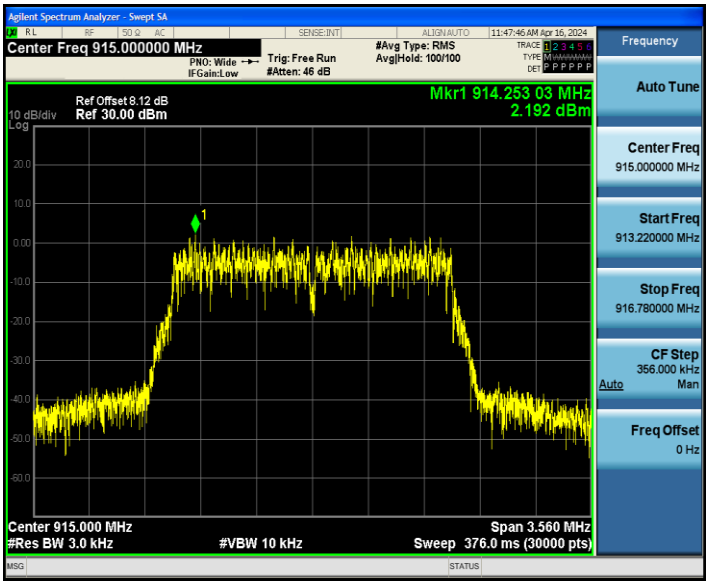
5.5.5 Test Results

Channel	Channel frequency (MHz)	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
Low	905	1.86	8.00	Pass
Middle	915	2.19		Pass
High	925	2.86		Pass

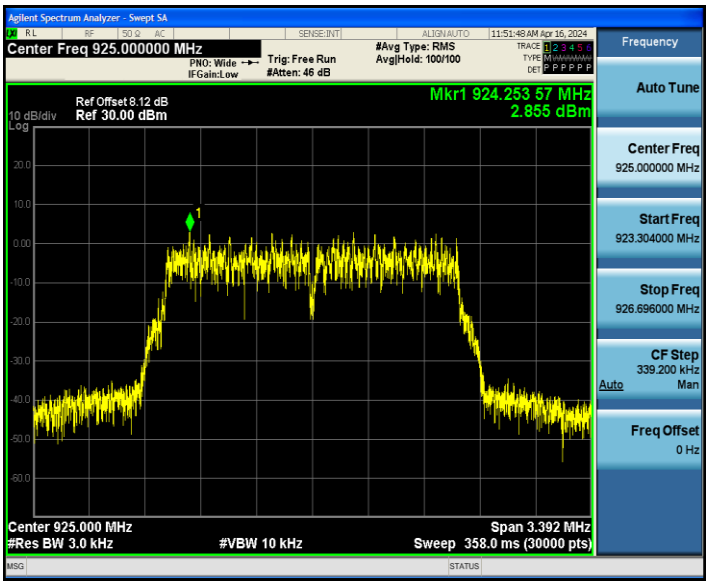
CH 01



CH 06


Agilent Spectrum Analyzer - Swept SA
Center Freq 915.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 46 dB
#Avg Type: RMS
Avg|Hold: 100/100
11:47:46 AM Apr 16, 2024
Ref Offset 8.12 dB
10 dB/div
Ref 30.00 dBm
Mkr1 914.253 03 MHz
2.192 dBm
Center 915.000 MHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.560 MHz
Sweep 376.0 ms (30000 pts)
Frequency
Auto Tune
Center Freq
915.000000 MHz
Start Freq
913.220000 MHz
Stop Freq
916.780000 MHz
CF Step
356.000 kHz
Auto
Man
Freq Offset
0 Hz

CH 11


Agilent Spectrum Analyzer - Swept SA
Center Freq 925.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 46 dB
#Avg Type: RMS
Avg|Hold: 100/100
11:51:48 AM Apr 16, 2024
Ref Offset 8.12 dB
10 dB/div
Ref 30.00 dBm
Mkr1 924.253 57 MHz
2.855 dBm
Center 925.000 MHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.392 MHz
Sweep 358.0 ms (30000 pts)
Frequency
Auto Tune
Center Freq
925.000000 MHz
Start Freq
923.304000 MHz
Stop Freq
926.696000 MHz
CF Step
339.200 kHz
Auto
Man
Freq Offset
0 Hz

5.6 6db Bandwidth

5.6.1 Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

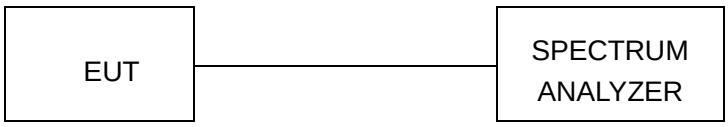
5.6.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100 KHz and VBW=300KHz.
The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
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 6 dB relative to the maximum level measured in the fundamental emission.

5.6.3 Deviation from Standard

No deviation.

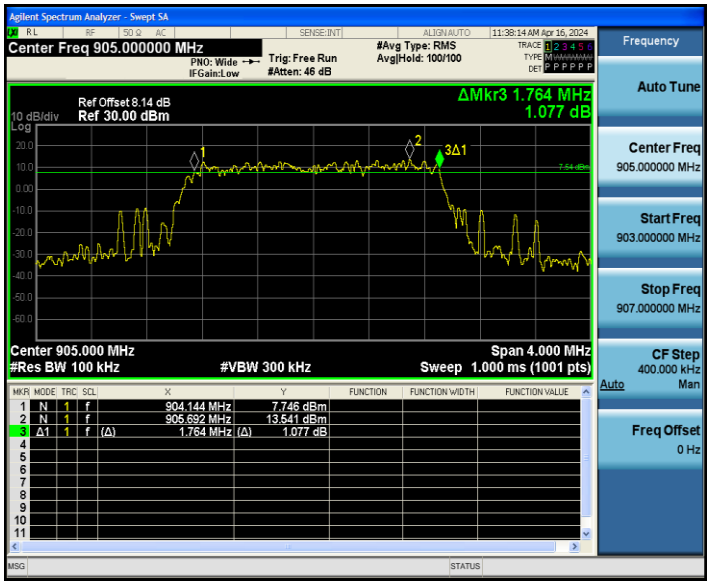
5.6.4 Test Setup



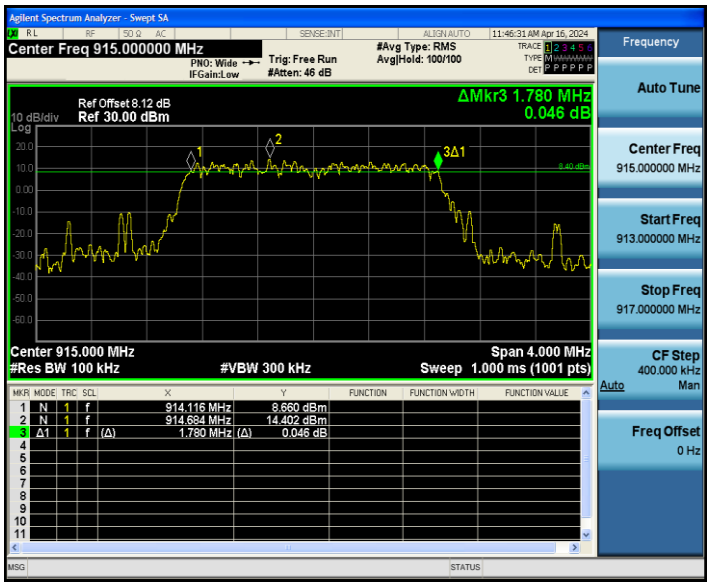
5.6.5 Test Result

Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
905	1.764	≥500	Pass
915	1.780		Pass
925	1.696		Pass

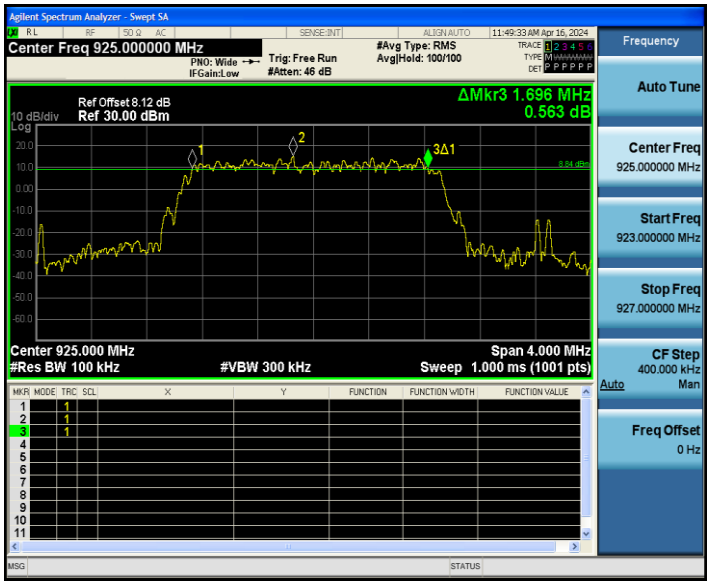
CH 01


Agilent Spectrum Analyzer - Swept SA
Center Freq 905.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 46 dB
#Avg Type: RMS
Avg|Hold: 100/100
11:38:14 AM Apr 16, 2024
Ref Offset 8.14 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 1.764 MHz
1.077 dB
Center 905.000 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 904.144 MHz 7.746 dBm
2 N 1 f 905.692 MHz 13.541 dBm
3 Δ1 1 f (Δ) 1.764 MHz (Δ) 1.077 dB
Frequency
Auto Tune
Center Freq
905.000000 MHz
Start Freq
903.000000 MHz
Stop Freq
907.000000 MHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

CH 06


Agilent Spectrum Analyzer - Swept SA
Center Freq 915.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 46 dB
#Avg Type: RMS
Avg|Hold: 100/100
11:46:31 AM Apr 16, 2024
Ref Offset 8.12 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 1.780 MHz
0.046 dB
Center 915.000 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 914.116 MHz 8.660 dBm
2 N 1 f 914.684 MHz 14.402 dBm
3 Δ1 1 f (Δ) 1.780 MHz (Δ) 0.046 dB
Frequency
Auto Tune
Center Freq
915.000000 MHz
Start Freq
913.000000 MHz
Stop Freq
917.000000 MHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

CH 11


Agilent Spectrum Analyzer - Swept SA
Center Freq 925.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 46 dB
#Avg Type: RMS
Avg|Hold: 100/100
11:49:33 AM Apr 16, 2024
Ref Offset 8.12 dB
10 dB/div
Ref 30.00 dBm
ΔMkr3 1.696 MHz
0.563 dB
Center 925.000 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
925.000000 MHz
Start Freq
923.000000 MHz
Stop Freq
927.000000 MHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

5.7 Occupied Bandwidth

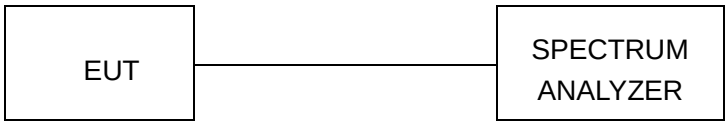
5.7.1 Test Procedure

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:
RBW=1% to 5% of the OBW
VBW=approximately 3 X RBW
Detector=Peak
Trace Mode: Max Hold
Use the 99% power bandwidth function of the instrument to measure the Occupied Bandwidth and recorded.

5.7.2 Deviation from Standard

No deviation.

5.7.3 Test Setup



5.7.4 Test Result

N/A

5.8 Band Edge

5.8.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section (b)(3) of RSS 5.4(4), the attenuation required shall be 30 dB instead of 20 dB.

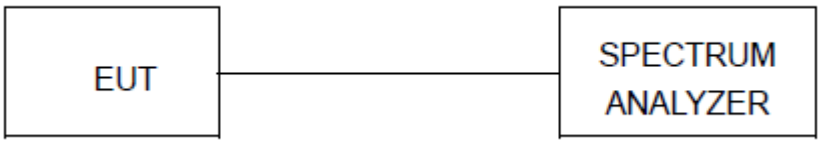
5.8.2 Test Procedure

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation, RBW ≥ 1% of the span, VBW ≥ RBW, Sweep = auto,
Detector function = peak, Trace = max hold

5.8.3 Deviation from Standard

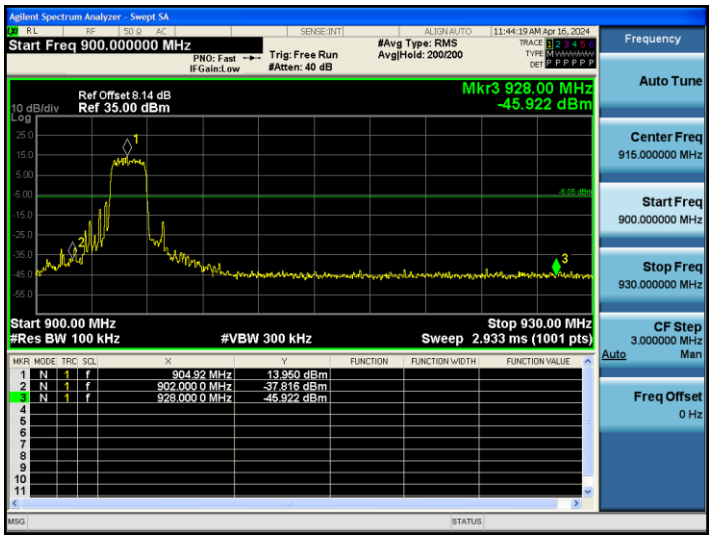
No deviation.

5.8.4 Test Setup



5.8.5 Test Results

PASS



5.9 Conducted Spurious Emissions

5.9.1 Applied Procedures / Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section (b)(3) of RSS 5.4(4), the attenuation required shall be 30 dB instead of 20 dB.
For below 30MHz,For 9KHz-150kHz,150K-10MHz,We use the RBW 1KHz,10KHz, So the limit need to calculated by “10lg(BW1/BW2)“. for example For9KHz-150kHz,RBW 1KHz, The Limit= the highest emission level-20-10log(100/1)= the highest emission level-40.

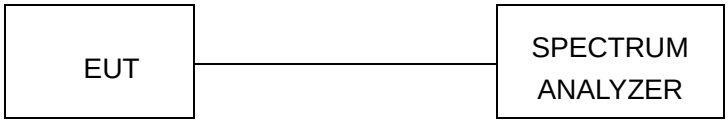
5.9.2 Test Procedure

a.The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b.Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation, RBW ≥ 1% of the span, VBW ≥ RBW, Sweep = auto,
Detector function = peak, Trace = max hold

5.9.3 Deviation from Standard

No deviation.

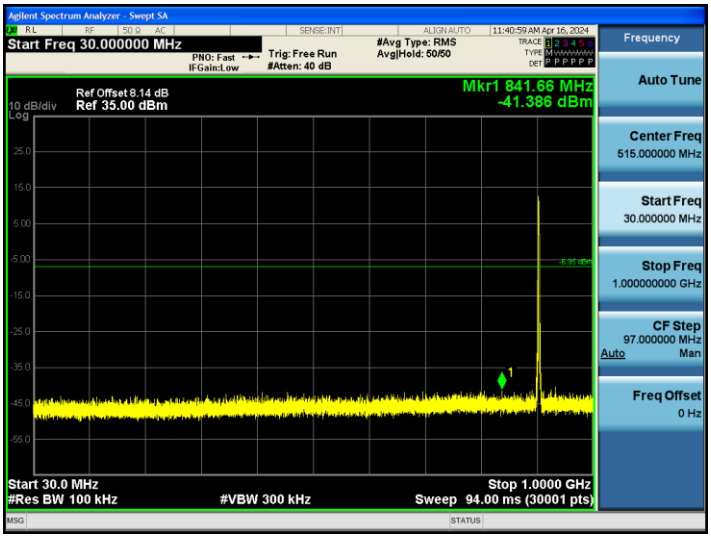
5.9.4 Test Setup



5.9.5 Test Results

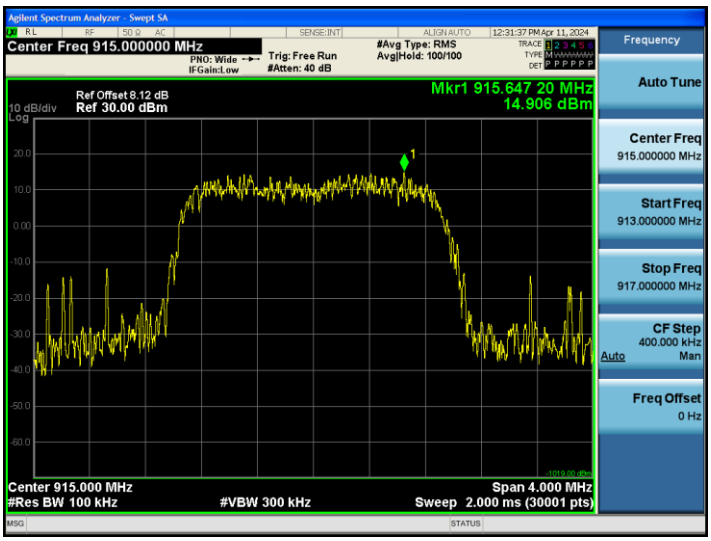
PASS

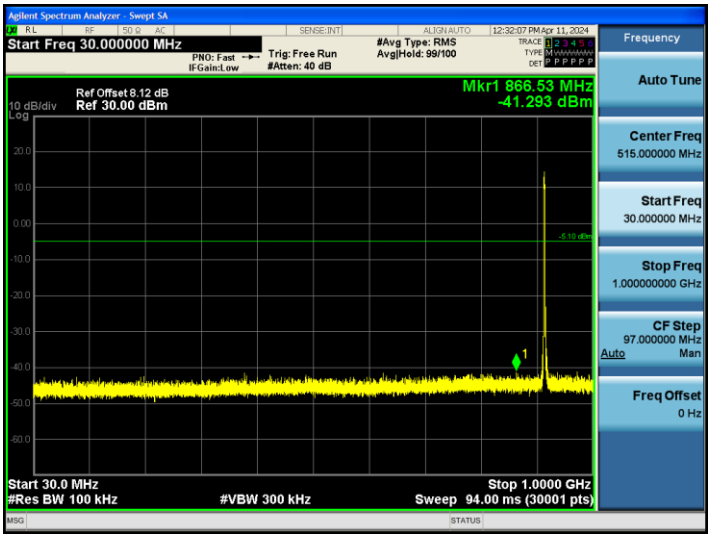
CH 01

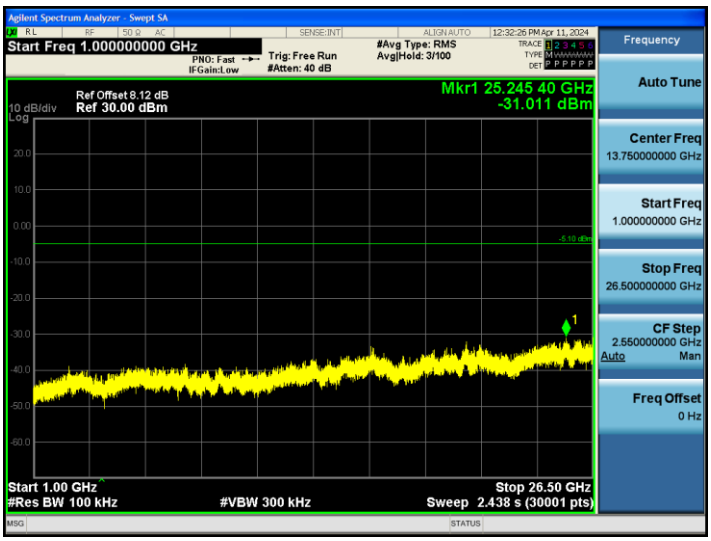


Agilent Spectrum Analyzer - Swept SA
Start Freq 1.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 7/50
11:41:26 AM Apr 16, 2024
Ref Offset 8.14 dB
10 dB/div
Ref 35.00 dBm
Mkr1 25.803 85 GHz
-29.088 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz

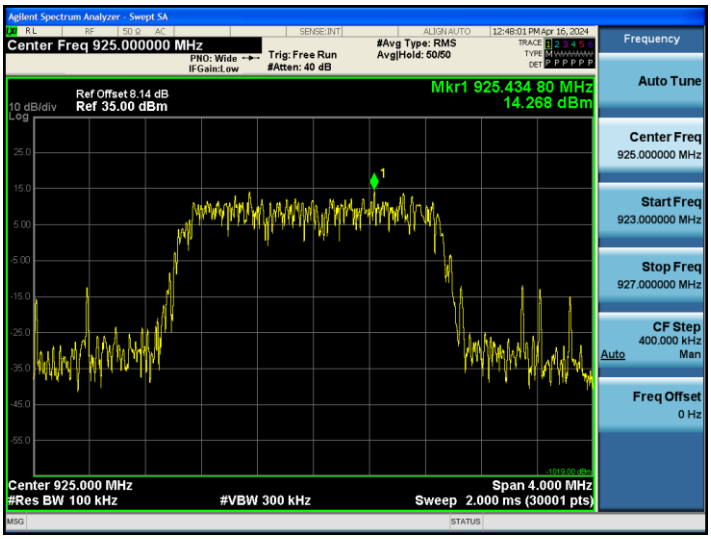
CH 06

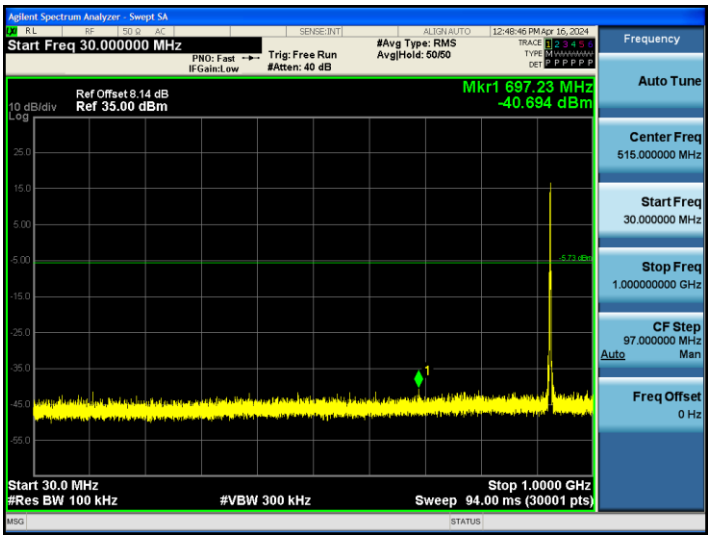

Agilent Spectrum Analyzer - Swept SA
Center Freq 915.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 100/100
12:31:37 PM Apr 11, 2024
Ref Offset 8.12 dB
10 dB/div
Ref 30.00 dBm
Mkr1 915.647 20 MHz
14.906 dBm
Center 915.000 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 2.000 ms (30001 pts)
Frequency
Auto Tune
Center Freq
915.000000 MHz
Start Freq
913.000000 MHz
Stop Freq
917.000000 MHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz

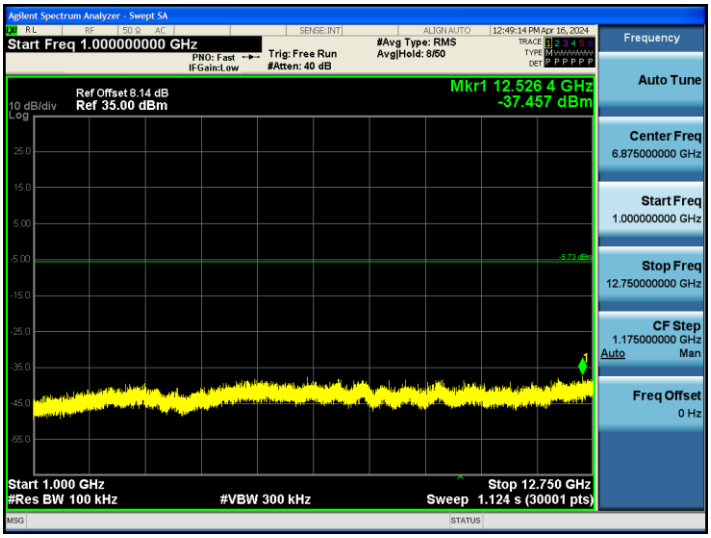

Agilent Spectrum Analyzer - Swept SA
Start Freq 30.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 99/100
12:32:07 PM Apr 11, 2024
Ref Offset 8.12 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 866.53 MHz
-41.293 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 94.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Start Freq 1.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 3/100
12:32:26 PM Apr 11, 2024
Ref Offset 8.12 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 25.245 40 GHz
-31.011 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 2.438 s (30001 pts)
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz

CH 11

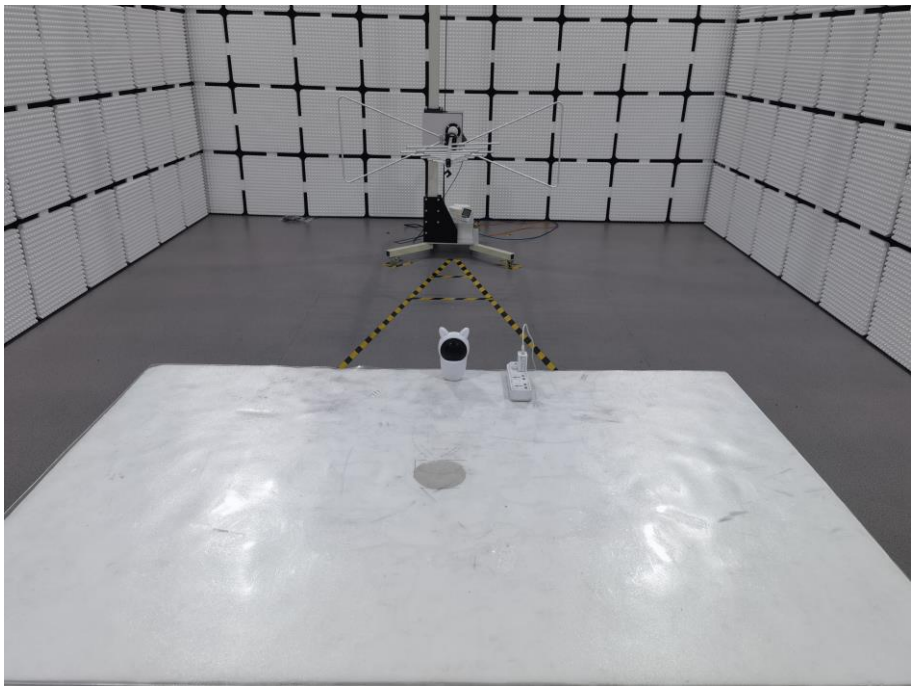

Agilent Spectrum Analyzer - Swept SA
Center Freq 925.000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 50/50
12:48:01 PM Apr 16, 2024
Ref Offset 8.14 dB
10 dB/div
Ref 35.00 dBm
Log
Mkr1 925.434 80 MHz
14.268 dBm
Center 925.000 MHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
Sweep 2.000 ms (30001 pts)
Frequency
Auto Tune
Center Freq
925.000000 MHz
Start Freq
923.000000 MHz
Stop Freq
927.000000 MHz
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Start Freq 30.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 50/50
12:48:46 PM Apr 16, 2024
Ref Offset 8.14 dB
10 dB/div
Ref 35.00 dBm
Log
Mkr1 697.23 MHz
-40.694 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 94.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Start Freq 1.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 8/50
12:49:14 PM Apr 16, 2024
Frequency
Auto Tune
Ref Offset 8.14 dB
10 dB/div
Ref 35.00 dBm
Log
Mkr1 12.526 4 GHz
-37.457 dBm
Center Freq
6.875000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
12.750000000 GHz
CF Step
1.175000000 GHz
Auto
Man
Freq Offset
0 Hz
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 12.750 GHz
Sweep 1.124 s (30001 pts)

6 Test Setup Photo

Radiated Emissions



7 PHOTOS OF THE EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos

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