VARIANT FCC TEST REPORT

(PART 22)

Applicant:	Xiaomi Communications Co., Ltd.
Address:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

Manufacturer or Supplier:	Xiaomi Communications Co., Ltd.
Address:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Product:	Mobile Phone
Brand Name:	Redmi
Model Name:	2303CRA44A
FCC ID:	2AFZZRA44A
Date of tests:	Feb. 07, 2023 ~ Feb. 20, 2023

The tests have been carried out according to the requirements of the following standard:

☒ **FCC PART 22, Subpart H** ☒ **FCC Part 2**
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI C63.26-2015**
☒ **ANSI/TIA/EIA-603-E**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Simon Wang Date: Feb. 20, 2023	Luke Lu Date: Feb. 20, 2023

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/ and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21100026RF13	Original release	Nov. 29, 2021
W7L-P23020004RF04	Based on the original product changing the model name and FCC ID, software version and hardware version, add adapter (MDY-14-EL, MDY-14-EK), remove adapter(MDY-11-EZ), replace USB Cable(B23230, H23230), change Rear Camera, The new Sample only verify RSE worst case and conducted power, So this report only replaces conducted Power and the low frequency data and the high frequency data (EDGE 850 CH128) of RSE.	Feb. 20, 2023

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2		
STANDARD SECTION	**TEST TYPE**	**RESULT**
§2.1046	Conducted Output Power	Compliance
§22.913 (a)(5)	Effective Radiated Power	Compliance
§2.1055 §22.355	Frequency Stability	See Note
§2.1049	Occupied Bandwidth	See Note
§22.913 (d)	Peak to average ratio*	See Note
§22.917(a)	Band Edge Measurements	See Note
§2.1051 §22.917(a)	Conducted Spurious Emissions	See Note
§2.1053 §22.917(a)	Radiated Spurious Emissions	Compliance

* Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01.

NOTE: Please refer to the original report W7L-P21100026RF13, FCC ID: 2AFZZ117SG.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Maximum Peak Output Power	±2.06dB
Frequency Stability	±76.97Hz
Radiated emissions (9KHz~30MHz)	±2.68dB
Radiated emissions (30MHz~1GHz)	±4.98dB
Radiated emissions (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Band Edge Measurements	±4.70dB
Peak to average ratio	±0.76dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 21,22	Feb. 20,23
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.15,22	May.14,23
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.04,22	Sep.03,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 06,22	Mar. 05,23
Horn Antenna	ETS-LINDGREN	3117	00168692	Mar. 06,22	Mar. 05,23
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 24, 22	Aug. 23, 23
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 15,22	Feb. 14,23
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 14,23	Feb. 13,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.12,22	May.11,23
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.12,22	May.11,23
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 21,22	Feb.20,23
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120	3.1.36	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	May. 07,22	May. 06,23
Power Meter	Anritsu	ML2495A	1506002	Feb. 22,22	Feb. 21,23
Power Sensor	Anritsu	MA2411B	1339352	May. 07,22	May. 06,23
Temperature Chamber	ESPEC	SH-242	93000855	May. 12,22	May. 11,23
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 18,22	Feb. 17,23
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 17,23	Feb. 16,24
Base station R&S CMW500	Rohde&Schwarz	CMW500	153085	May.12,22	May.11,23
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 24,22	Aug. 23,23

NOTE: 1.The calibration interval of the above test instruments is 12 months or 36months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.

3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mobile Phone	
BRAND NAME	Redmi	
MODEL NAME	2201117SG	
NOMINAL VOLTAGE	5.0V/9.0V/11.0V/12.0V/20.0Vdc(adapter or host equipment) 3.87Vdc (Li-ion, battery)	
MODULATION TYPE	**GSM/GPRS/EDGE**	GMSK, 8PSK
	WCDMA	QPSK
	LTE	QPSK, 16QAM, 64QAM
FREQUENCY RANGE	**GSM/GPRS/EDGE**	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	824.7MHz ~ 848.3MHz
	LTE Band 5 (Channel Bandwidth: 3MHz)	825.5MHz ~ 847.5MHz
	LTE Band 5 (Channel Bandwidth: 5MHz)	826.5MHz ~ 846.5MHz
	LTE Band 5 (Channel Bandwidth: 10MHz)	829MHz ~ 844MHz
MAX. ERP POWER	**GSM/GPRS**	539.51mW
	EDGE	120.23mW
	WCDMA	73.62mW
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	68.08mW
	LTE Band 5 (Channel Bandwidth: 3MHz)	68.08mW
	LTE Band 5 (Channel Bandwidth: 5MHz)	68.71mW
	LTE Band 5 (Channel Bandwidth: 10MHz)	69.02mW
EMISSION DESIGNATORGOGN	**GSM/GPRS**	248KGXW
	EDGE	244KGXW
	WCDMA	4M19F9W
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	QPSK: 1M11G7D
		16QAM: 1M12W7D
		64QAM: 1M12W7D
	LTE Band 5 (Channel Bandwidth: 3MHz)	QPSK: 2M73G7D
		16QAM: 2M74W7D
		64QAM: 2M73W7D

	LTE Band 5 (Channel Bandwidth: 5MHz)	QPSK: 4M55G7D
		16QAM: 4M56W7D
		64QAM: 4M55W7D
	LTE Band 5 (Channel Bandwidth: 10MHz)	QPSK: 9M05G7D
		16QAM: 9M06W7D
		64QAM:9M07W7D
ANTENNA TYPE	Ant0:PIFA Antenna with -3.36dBi gain for GSM850/ WCDMA V/LTE B5 Ant1:Fixed Internal Antenna with -3.45dBi gain for GSM850/ WCDMA V/LTE B5	
HW VERSION	P1	
SW VERSION	MIUI14	
IMEI	8666988060013488	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB1 cable: unshielded without ferrite, 1.0meter USB2 cable: unshielded without ferrite, 1.0meter	
EXTREME TEMPERATURE	0-40 ℃	
EXTREME VOLTAGE	EUT 3.6V - EUT 4.2V	

NOTE:

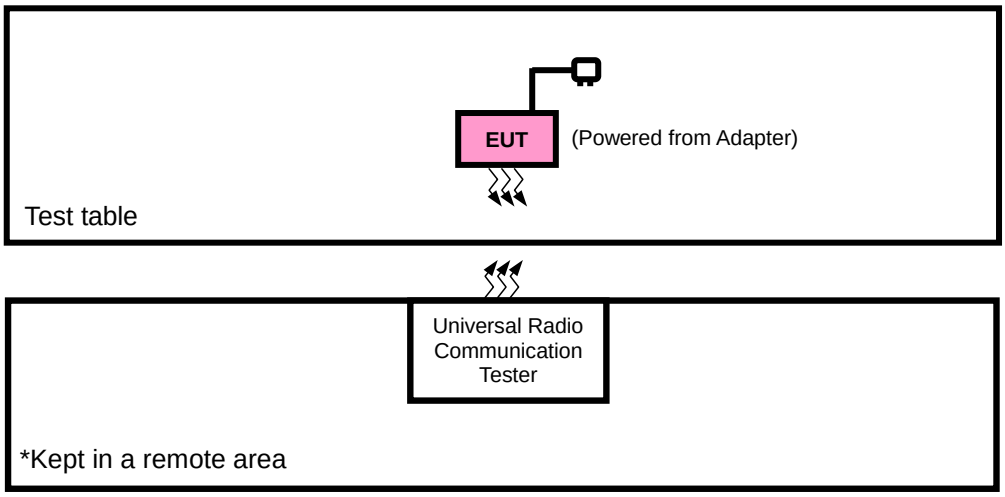
1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
LTE	1TX/1RX

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION



2.3 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	Kikusui/JP	PMX18-5A	0000001	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m

2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports The worst case in ERP and radiated emission was found when positioned on X-plane for GSM /EDGE /LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + Adapter with GSM or WCDMA or LTE link**

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
A	ERP	128 to 251	128, 189, 251	GSM,EDGE
A	RADIATED EMISSION	128 to 251	128, 189, 251	GSM,EDGE

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 5/9/12/20/11V By Adapter	Jace Hu
RADIATED EMISSION	23deg. C, 70%RH	DC 5/9/12/20/11V By Adapter	Jace Hu

2.5 EUT OPERATING CONDITIONS

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 22

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-D

ANSI/TIA/EIA-603-E

ANSI C63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile / Portable station are limited to 7 watts e.r.p.

3.1.2 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determing the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

ERP or EIRP = $P_{Meas} + G_T - L_C$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

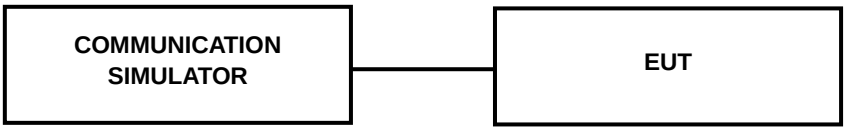
CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with WCDMA link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Ant0:

Band	GSM850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM (GMSK, 1Tx-slot)	32.77	**32.83**	32.65
GPRS (GMSK, 1Tx-slot)	32.75	32.82	32.63
GPRS (GMSK, 2Tx-slot)	30.60	30.64	30.51
GPRS (GMSK, 3Tx-slot)	28.89	28.97	28.76
GPRS (GMSK, 4Tx-slot)	26.97	27.02	26.84
EDGE (8PSK, 1Tx-slot)	26.23	26.09	26.06
EDGE (8PSK, 2Tx-slot)	23.72	23.57	23.53
EDGE (8PSK, 3Tx-slot)	22.29	22.14	22.00
EDGE (8PSK, 4Tx-slot)	20.64	20.58	20.52

Band	WCDMA V		
Channel	4132	4182	4233
Frequency	826.4	836.4	846.6
RMC 12.2K	**24.16**	24.11	24.09
HSDPA Subtest-1	23.12	23.06	23.08
HSDPA Subtest-2	23.10	23.09	23.04
HSDPA Subtest-3	22.69	22.66	22.67
HSDPA Subtest-4	22.68	22.69	22.64
DC-HSDPA Subtest-1	23.14	23.03	23.07
DC-HSDPA Subtest-2	23.08	23.05	23.01
DC-HSDPA Subtest-3	22.70	22.69	22.63
DC-HSDPA Subtest-4	22.69	22.66	22.67
HSUPA Subtest-1	21.22	21.18	21.14
HSUPA Subtest-2	21.53	21.46	21.41
HSUPA Subtest-3	22.24	22.13	22.15
HSUPA Subtest-4	21.24	21.12	21.11
HSUPA Subtest-5	22.60	22.56	22.57

LTE Band 5

Band/BW	Modulation	RB Size	RB Offset	Low CH 20407	Mid CH 20525	High CH 20643
				Frequency 824.7 MHz	Frequency 836.5 MHz	Frequency 848.3 MHz
5/ 1.4	QPSK	1	0	23.82	23.84	23.77
		1	2	23.72	23.82	23.72
		1	5	23.77	23.75	23.77
		3	0	23.44	23.50	23.46
		3	1	23.57	23.63	23.58
		3	3	23.47	23.65	23.50
		6	0	22.84	22.82	22.84
	16QAM	1	0	23.01	23.12	22.99
		1	2	22.99	23.10	23.01
		1	5	23.03	23.16	23.08
		3	0	22.75	22.73	22.73
		3	1	22.80	22.89	22.82
		3	3	22.79	22.94	22.78
		6	0	21.79	21.88	21.86
	64QAM	1	0	21.99	22.02	21.91
		1	2	21.94	22.12	22.00
		1	5	22.10	22.08	22.03
		3	0	21.71	21.82	21.71
		3	1	21.81	21.97	21.84
		3	3	21.84	21.85	21.81
		6	0	20.80	20.88	20.79

Band/BW	Modulation	RB Size	RB Offset	Low CH 20415	Mid CH 20525	High CH 20635
				Frequency 825.5 MHz	Frequency 836.5 MHz	Frequency 847.5 MHz
5/ 3	QPSK	1	0	23.77	23.83	23.74
		1	7	23.70	23.84	23.75
		1	14	23.71	23.81	23.73
		8	0	22.71	22.87	22.75
		8	3	22.87	22.93	22.85
		8	7	22.77	22.95	22.83
		15	0	22.83	22.82	22.81
	16QAM	1	0	23.05	23.06	23.03
		1	7	22.98	23.11	22.98
		1	14	23.08	23.12	23.11
		8	0	21.75	21.74	21.70
		8	3	21.82	21.87	21.88
		8	7	21.84	21.94	21.76
		15	0	21.79	21.88	21.81
	64QAM	1	0	22.02	22.01	21.94
		1	7	21.97	22.12	21.98
		1	14	22.10	22.08	22.04
		8	0	20.71	20.84	20.74
		8	3	20.85	20.91	20.89
		8	7	20.81	20.89	20.77
		15	0	20.82	20.85	20.83

Band/BW	Modulation	RB Size	RB Offset	Low CH 20425	Mid CH 20525	High CH 20625
				Frequency 826.5 MHz	Frequency 836.5 MHz	Frequency 846.5 MHz
5/ 5	QPSK	1	0	23.79	23.85	23.74
		1	12	23.69	23.88	23.72
		1	24	23.75	23.78	23.78
		12	0	22.73	22.86	22.72
		12	6	22.84	22.93	22.91
		12	13	22.77	22.94	22.80
		25	0	22.86	22.79	22.83
	16QAM	1	0	22.99	23.08	22.96
		1	12	23.00	23.13	22.97
		1	24	23.04	23.13	23.11
		12	0	21.71	21.74	21.70
		12	6	21.81	21.90	21.88
		12	13	21.77	21.94	21.78
		25	0	21.76	21.95	21.85
	64QAM	1	0	21.99	22.02	21.88
		1	12	21.94	22.13	22.03
		1	24	22.08	22.11	21.97
		12	0	20.73	20.86	20.76
		12	6	20.79	20.98	20.88
		12	13	20.85	20.88	20.74
		25	0	20.78	20.91	20.81

Band/BW	Modulation	RB Size	RB Offset	Low CH 20450	Mid CH 20525	High CH 20600
				Frequency 829 MHz	Frequency 836.5 MHz	Frequency 844 MHz
5/ 10	QPSK	1	0	23.83	**23.90**	23.79
		1	24	23.77	23.89	23.77
		1	49	23.79	23.83	23.79
		25	0	22.79	22.88	22.77
		25	12	22.91	22.98	22.93
		25	25	22.85	22.96	22.85
		50	0	22.88	22.87	22.85
	16QAM	1	0	23.07	23.14	23.04
		1	24	23.06	23.15	23.03
		1	49	23.11	23.18	23.13
		25	0	21.77	21.81	21.75
		25	12	21.88	21.95	21.90
		25	25	21.85	21.96	21.84
		50	0	21.84	21.96	21.87
	64QAM	1	0	22.03	22.07	21.96
		1	24	22.02	22.14	22.05
		1	49	22.12	22.16	22.05
		25	0	20.79	20.88	20.79
		25	12	20.87	20.99	20.90
		25	25	20.89	20.93	20.82
		50	0	20.84	20.93	20.84

Ant1:

Band	GSM850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM (GMSK, 1Tx-slot)	32.58	**32.63**	32.50
GPRS (GMSK, 1Tx-slot)	32.55	32.61	32.50
GPRS (GMSK, 2Tx-slot)	30.71	30.74	30.64
GPRS (GMSK, 3Tx-slot)	28.95	29.03	28.99
GPRS (GMSK, 4Tx-slot)	27.04	27.12	26.99
EDGE (8PSK, 1Tx-slot)	26.33	26.40	26.35
EDGE (8PSK, 2Tx-slot)	23.73	23.88	23.96
EDGE (8PSK, 3Tx-slot)	22.09	22.15	22.40
EDGE (8PSK, 4Tx-slot)	20.94	20.90	20.88

Band	WCDMA V		
Channel	4132	4182	4233
Frequency	826.4	836.4	846.6
RMC 12.2K	**24.27**	24.16	24.19
HSDPA Subtest-1	23.24	23.10	23.17
HSDPA Subtest-2	23.25	23.09	23.18
HSDPA Subtest-3	22.69	22.51	22.63
HSDPA Subtest-4	22.73	22.58	22.66
DC-HSDPA Subtest-1	23.19	23.02	23.12
DC-HSDPA Subtest-2	23.24	23.03	23.16
DC-HSDPA Subtest-3	22.64	22.44	22.58
DC-HSDPA Subtest-4	22.71	22.50	22.64
HSUPA Subtest-1	23.22	23.08	23.11
HSUPA Subtest-2	21.18	21.03	21.05
HSUPA Subtest-3	22.10	22.02	22.03
HSUPA Subtest-4	21.14	20.98	21.04
HSUPA Subtest-5	23.16	23.06	23.06

LTE Band 5

Band/BW	Modulation	RB Size	RB Offset	Low CH 20407	Mid CH 20525	High CH 20643
				Frequency 824.7 MHz	Frequency 836.5 MHz	Frequency 848.3 MHz
5/ 1.4	QPSK	1	0	23.80	23.79	23.80
		1	2	23.76	23.86	23.81
		1	5	23.77	23.75	23.82
		3	0	23.72	23.78	23.79
		3	1	23.83	23.89	23.88
		3	3	23.74	23.92	23.82
		6	0	22.80	22.78	22.85
	16QAM	1	0	23.02	23.13	23.05
		1	2	23.05	23.16	23.12
		1	5	23.04	23.17	23.14
		3	0	22.74	22.72	22.77
		3	1	22.79	22.88	22.86
		3	3	22.75	22.90	22.79
		6	0	21.78	21.87	21.90
	64QAM	1	0	22.00	22.03	21.97
		1	2	21.99	22.17	22.10
		1	5	22.07	22.05	22.05
		3	0	21.69	21.80	21.74
		3	1	21.82	21.98	21.90
		3	3	21.82	21.83	21.84
		6	0	20.82	20.90	20.86

Band/BW	Modulation	RB Size	RB Offset	Low CH 20415	Mid CH 20525	High CH 20635
				Frequency 825.5 MHz	Frequency 836.5 MHz	Frequency 847.5 MHz
5/ 3	QPSK	1	0	23.75	23.78	23.77
		1	7	23.74	23.88	23.84
		1	14	23.71	23.81	23.78
		8	0	22.69	22.85	22.78
		8	3	22.83	22.89	22.85
		8	7	22.74	22.92	22.85
		15	0	22.79	22.78	22.82
	16QAM	1	0	23.06	23.07	23.09
		1	7	23.04	23.17	23.09
		1	14	23.09	23.13	23.17
		8	0	21.74	21.73	21.74
		8	3	21.81	21.86	21.92
		8	7	21.80	21.90	21.77
		15	0	21.78	21.87	21.85
	64QAM	1	0	22.03	22.02	22.00
		1	7	22.02	22.17	22.08
		1	14	22.07	22.05	22.06
		8	0	20.69	20.82	20.77
		8	3	20.86	20.92	20.95
		8	7	20.79	20.87	20.80
		15	0	20.84	20.87	20.90

Band/BW	Modulation	RB Size	RB Offset	Low CH 20425	Mid CH 20525	High CH 20625
				Frequency 826.5 MHz	Frequency 836.5 MHz	Frequency 846.5 MHz
5/ 5	QPSK	1	0	23.77	23.80	23.77
		1	12	23.73	23.92	23.81
		1	24	23.75	23.78	23.83
		12	0	22.71	22.84	22.75
		12	6	22.80	22.89	22.91
		12	13	22.74	22.91	22.82
		25	0	22.82	22.75	22.84
	16QAM	1	0	23.00	23.09	23.02
		1	12	23.06	23.19	23.08
		1	24	23.05	23.14	23.17
		12	0	21.70	21.73	21.74
		12	6	21.80	21.89	21.92
		12	13	21.73	21.90	21.79
		25	0	21.75	21.94	21.89
	64QAM	1	0	22.00	22.03	21.94
		1	12	21.99	22.18	22.13
		1	24	22.05	22.08	21.99
		12	0	20.71	20.84	20.79
		12	6	20.80	20.99	20.94
		12	13	20.83	20.86	20.77
		25	0	20.80	20.93	20.88

Band/BW	Modulation	RB Size	RB Offset	Low CH 20450	Mid CH 20525	High CH 20600
				Frequency 829 MHz	Frequency 836.5 MHz	Frequency 844 MHz
5/ 10	QPSK	1	0	23.81	23.85	23.82
		1	24	23.81	**23.93**	23.86
		1	49	23.79	23.83	23.84
		25	0	22.77	22.86	22.80
		25	12	22.87	22.94	22.93
		25	25	22.82	22.93	22.87
		50	0	22.84	22.83	22.86
	16QAM	1	0	23.08	23.15	23.10
		1	24	23.12	23.21	23.14
		1	49	23.12	23.19	23.19
		25	0	21.76	21.80	21.79
		25	12	21.87	21.94	21.94
		25	25	21.81	21.92	21.85
		50	0	21.83	21.95	21.91
	64QAM	1	0	22.04	22.08	22.02
		1	24	22.07	22.19	22.15
		1	49	22.09	22.13	22.07
		25	0	20.77	20.86	20.82
		25	12	20.88	21.00	20.96
		25	25	20.87	20.91	20.85
		50	0	20.86	20.95	20.91

ERP POWER (dBm)
Ant0:

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	32.77	-3.36	27.26	532.11	7
189	836.4	32.83	-3.36	27.32	539.51	7
251	848.8	32.65	-3.36	27.14	517.61	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

EDGE

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	26.23	-3.36	20.72	118.03	7
189	836.4	26.09	-3.36	20.58	114.29	7
251	848.8	26.06	-3.36	20.55	113.5	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

WCDMA

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
4132	826.4	24.16	-3.36	18.65	73.28	7
4182	836.4	24.11	-3.36	18.6	72.44	7
4233	846.6	24.09	-3.36	18.58	72.11	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

LTE BAND 5

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	23.82	-3.36	18.31	67.76	7
20525	836.5	23.84	-3.36	18.33	68.08	7
20643	848.3	23.77	-3.36	18.26	66.99	7

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	23.03	-3.36	17.52	56.49	7
20525	836.5	23.16	-3.36	17.65	58.21	7
20643	848.3	23.08	-3.36	17.57	57.15	7

CHANNEL BANDWIDTH: 1.4MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	22.1	-3.36	16.59	45.6	7
20525	836.5	22.12	-3.36	16.61	45.81	7
20643	848.3	22.03	-3.36	16.52	44.87	7

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	23.77	-3.36	18.26	66.99	7
20525	836.5	23.84	-3.36	18.33	68.08	7
20635	847.5	23.75	-3.36	18.24	66.68	7

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	23.08	-3.36	17.57	57.15	7
20525	836.5	23.12	-3.36	17.61	57.68	7
20635	847.5	23.11	-3.36	17.6	57.54	7

CHANNEL BANDWIDTH: 3MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	22.1	-3.36	16.59	45.6	7
20525	836.5	22.12	-3.36	16.61	45.81	7
20635	847.5	22.04	-3.36	16.53	44.98	7

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	23.79	-3.36	18.28	67.3	7
20525	836.5	23.88	-3.36	18.37	68.71	7
20625	846.5	23.78	-3.36	18.27	67.14	7

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	23.04	-3.36	17.53	56.62	7
20525	836.5	23.13	-3.36	17.62	57.81	7
20625	846.5	23.11	-3.36	17.6	57.54	7

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	22.08	-3.36	16.57	45.39	7
20525	836.5	22.13	-3.36	16.62	45.92	7
20625	846.5	22.03	-3.36	16.52	44.87	7

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	23.83	-3.36	18.32	67.92	7
20525	836.5	23.9	-3.36	18.39	69.02	7
20600	844.0	23.79	-3.36	18.28	67.3	7

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	23.11	-3.36	17.6	57.54	7
20525	836.5	23.18	-3.36	17.67	58.48	7
20600	844.0	23.13	-3.36	17.62	57.81	7

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	22.12	-3.36	16.61	45.81	7
20525	836.5	22.16	-3.36	16.65	46.24	7
20600	844.0	22.05	-3.36	16.54	45.08	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

Ant1:

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	32.58	-3.45	26.98	498.88	7
189	836.4	32.63	-3.45	27.03	504.66	7
251	848.8	32.5	-3.45	26.9	489.78	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

EDGE

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	26.33	-3.45	20.73	118.3	7
189	836.4	26.4	-3.45	20.8	120.23	7
251	848.8	26.35	-3.45	20.75	118.85	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

WCDMA

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
4132	826.4	24.27	-3.45	18.67	73.62	7
4182	836.4	24.16	-3.45	18.56	71.78	7
4233	846.6	24.19	-3.45	18.59	72.28	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

LTE BAND 5

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	23.83	-3.45	18.23	66.53	7
20525	836.5	23.92	-3.45	18.32	67.92	7
20643	848.3	23.88	-3.45	18.28	67.3	7

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	23.05	-3.45	17.45	55.59	7
20525	836.5	23.17	-3.45	17.57	57.15	7
20643	848.3	23.14	-3.45	17.54	56.75	7

CHANNEL BANDWIDTH: 1.4MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20407	824.7	22.07	-3.45	16.47	44.36	7
20525	836.5	22.17	-3.45	16.57	45.39	7
20643	848.3	22.1	-3.45	16.5	44.67	7

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	23.75	-3.45	18.15	65.31	7
20525	836.5	23.88	-3.45	18.28	67.3	7
20635	847.5	23.84	-3.45	18.24	66.68	7

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	23.09	-3.45	17.49	56.1	7
20525	836.5	23.17	-3.45	17.57	57.15	7
20635	847.5	23.17	-3.45	17.57	57.15	7

CHANNEL BANDWIDTH: 3MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20415	825.5	22.07	-3.45	16.47	44.36	7
20525	836.5	22.17	-3.45	16.57	45.39	7
20635	847.5	22.08	-3.45	16.48	44.46	7

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	23.77	-3.45	18.17	65.61	7
20525	836.5	23.92	-3.45	18.32	67.92	7
20625	846.5	23.83	-3.45	18.23	66.53	7

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	23.06	-3.45	17.46	55.72	7
20525	836.5	23.19	-3.45	17.59	57.41	7
20625	846.5	23.17	-3.45	17.57	57.15	7

CHANNEL BANDWIDTH: 5MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20425	826.5	22.05	-3.45	16.45	44.16	7
20525	836.5	22.18	-3.45	16.58	45.5	7
20625	846.5	22.13	-3.45	16.53	44.98	7

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	23.81	-3.45	18.21	66.22	7
20525	836.5	23.93	-3.45	18.33	68.08	7
20600	844.0	23.86	-3.45	18.26	66.99	7

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	23.12	-3.45	17.52	56.49	7
20525	836.5	23.21	-3.45	17.61	57.68	7
20600	844.0	23.19	-3.45	17.59	57.41	7

CHANNEL BANDWIDTH: 10MHz 64QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
20450	829.0	22.09	-3.45	16.49	44.57	7
20525	836.5	22.19	-3.45	16.59	45.6	7
20600	844.0	22.15	-3.45	16.55	45.19	7

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

3.2.2 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

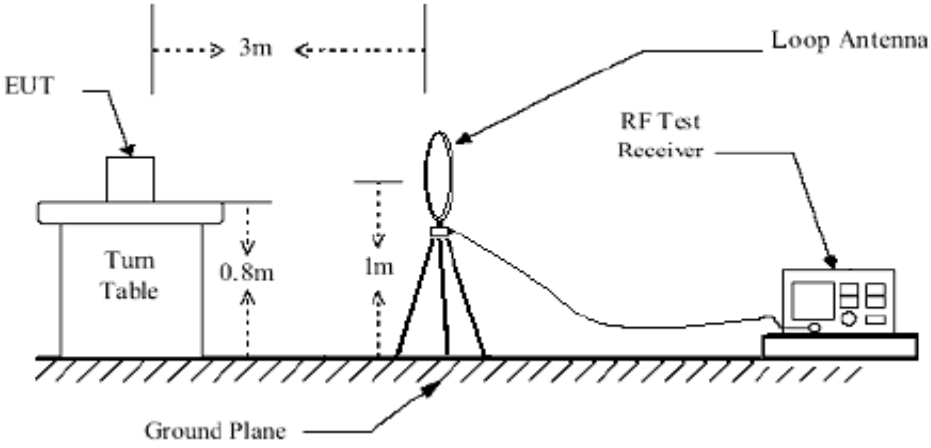
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.2.3 DEVIATION FROM TEST STANDARD

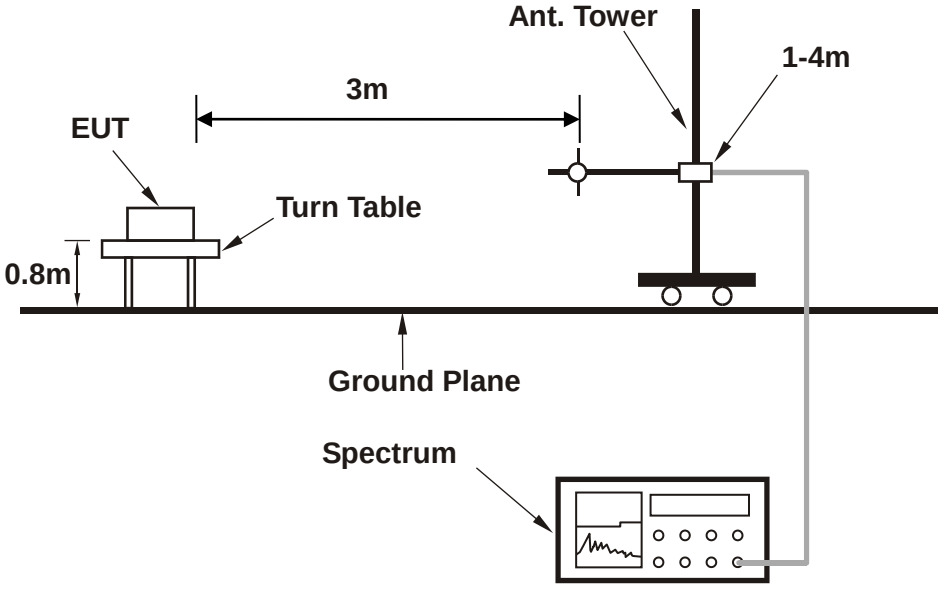
No deviation

3.2.4 TEST SETUP

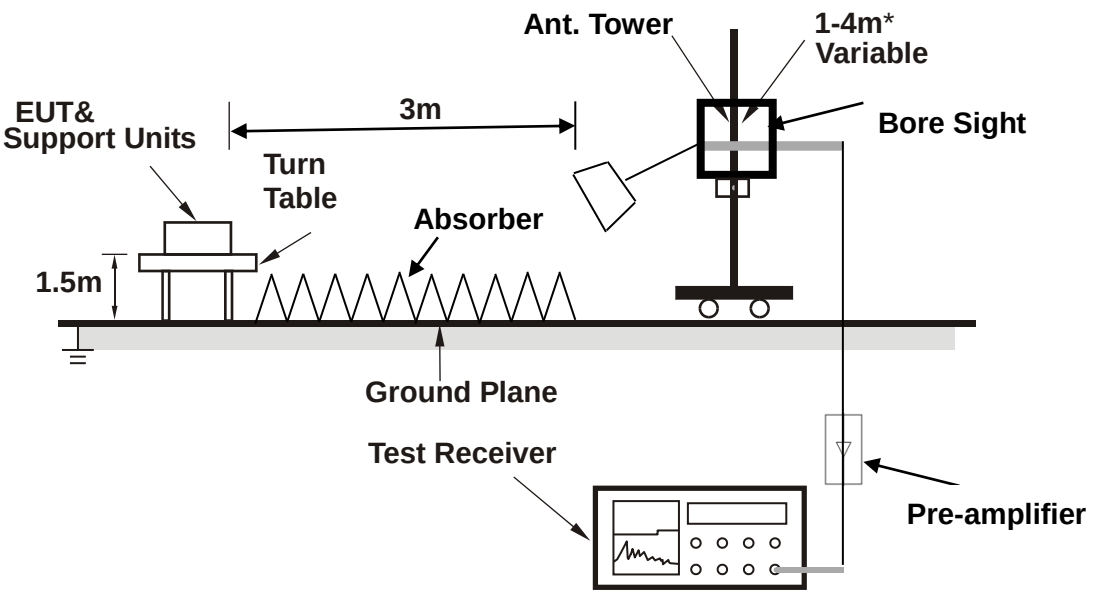
< Frequency Range below 30MHz >



< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.2.5 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA

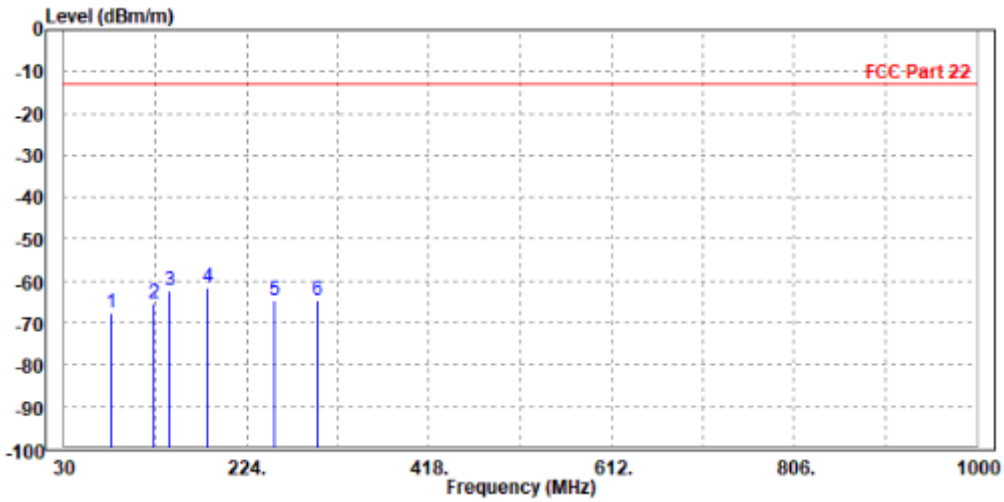
30 MHz – 1GHz data:

EDGE 850(Ant1):

CHANNEL BANDWIDTH: 128 ~ 251

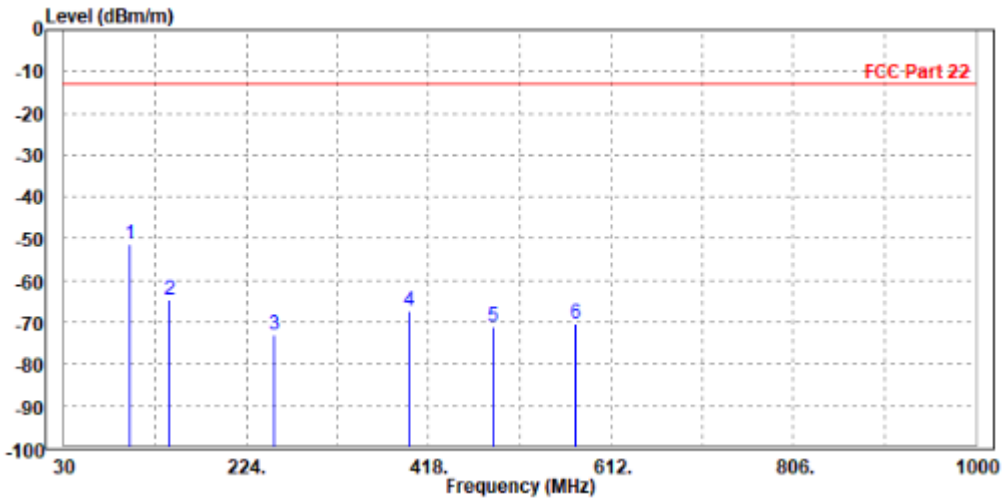
MODE	TX channel 128	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		80.440	-67.68	-46.14	-13.00	-54.68	-21.54	Peak	Horizontal
2		126.030	-65.33	-44.26	-13.00	-52.33	-21.07	Peak	Horizontal
3		142.520	-62.50	-43.25	-13.00	-49.50	-19.25	Peak	Horizontal
4	PP	182.290	-61.67	-43.47	-13.00	-48.67	-18.20	Peak	Horizontal
5		253.100	-64.75	-53.24	-13.00	-51.75	-11.51	Peak	Horizontal
6		298.690	-64.77	-52.33	-13.00	-51.77	-12.44	Peak	Horizontal



MODE	TX channel 128	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	100.810	-51.52	-44.82	-13.00	-38.52	-6.70	Peak	Vertical
2	142.520	-64.56	-50.31	-13.00	-51.56	-14.25	Peak	Vertical
3	254.070	-72.96	-59.59	-13.00	-59.96	-13.37	Peak	Vertical
4	396.660	-67.24	-58.18	-13.00	-54.24	-9.06	Peak	Vertical
5	486.870	-71.12	-62.92	-13.00	-58.12	-8.20	Peak	Vertical
6	574.170	-70.16	-63.52	-13.00	-57.16	-6.64	Peak	Vertical



ABOVE 1GHz DATA

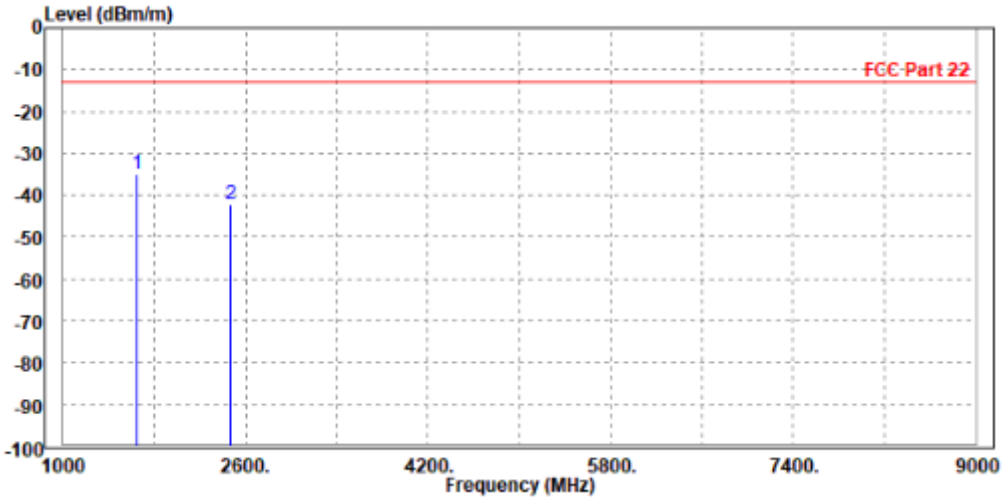
Note: For higher frequency, the emission is too low to be detected.

EDGE 850(Ant1):

CH 128:

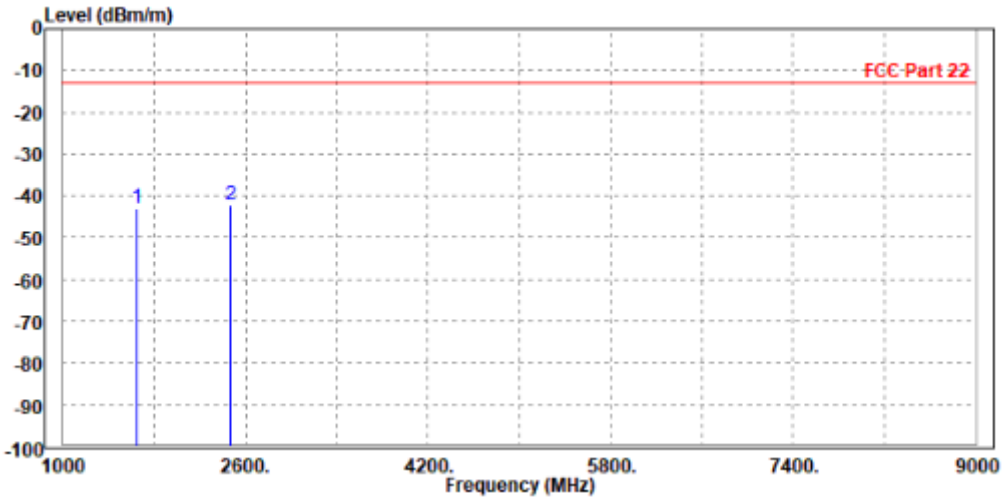
MODE	TX channel 128	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1648.000	-34.99	-35.76	-13.00	-21.99	0.77	Peak	Horizontal
2	2472.000	-42.07	-47.41	-13.00	-29.07	5.34	Peak	Horizontal



MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60HZ
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1648.000	-43.00	-44.04	-13.00	-30.00	1.04	Peak	Vertical
2	PP	2472.000	-42.22	-47.08	-13.00	-29.22	4.86	Peak	Vertical



4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5 INFORMATION ON THE TESTING LABORATORIES

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

6 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.