VARIANT FCC TEST REPORT

(PART 22)

Applicant:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland

Manufacturer or Supplier:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland
Product:	Multi-band GSM/WCDMA/LTE phone with Bluetooth&WLAN
Brand Name:	NOKIA
Model Name:	TA-1412
FCC ID:	2AJOTTA-1412
Date of tests:	Nov. 25, 2021 ~ Oct. 10, 2022

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: Oct. 10, 2022	Luke Lu Date: Oct. 10, 2022

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-P21100018-1RF04	Original release	Dec. 13, 2021
W7L-P21100018-2RF04	The model name is revised based on the W7L-P21100018-1RF04 report. The two models are only the difference between single SIM and double SIM, and the data reflects the original report data.	Dec. 25, 2021
W7L-P22090015-5RF04	Based on the original product changing the packaging factory of the chip and software version, removed Aohai_A829US adapter ,BRL_ CB - 36A USB cable, Saibao_ CB - 12A USB cable, LEADER_ HS-34 earphone, added Saibao_AC-2A USB cable. The new sample verify Power and RSE worst case (GSM 850), other test data is copied from the original test report W7L-P21100018-2RF04.	Oct. 10, 2022

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 22.913 (a)	Effective Radiated Power	Compliance
2.1055 22.355	Frequency Stability	Compliance
2.1049 22.917 (b)	Occupied Bandwidth	Compliance
22.913 (d)	Peak to average ratio*	Compliance
22.917	Band Edge Measurements	Compliance
2.1051 22.917	Conducted Spurious Emissions	Compliance
2.1053 22.917	Radiated Spurious Emissions	Compliance

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

Note:

1. The power table are not updated,Because the same as for original case power in Verified power.

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 (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±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	Apr. 22,21	Apr. 21,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 21,22	Apr. 20,23
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Jun. 03,21	Jun. 02,22
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Jun. 02,22	Jun. 01,23
Bilog Antenna 2	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Bilog Antenna 2	ETS-LINDGREN	3143B	00161965	Mar. 04,22	Mar. 03,23
Horn Antenna 1	ETS-LINDGREN	3117	00168728	Aug. 19,21	Aug. 18,22
Horn Antenna 1	ETS-LINDGREN	3117	00168728	Aug. 18,22	Aug. 17,23
Horn Antenna 2	ETS-LINDGREN	3117	00168692	Apr. 02,21	Apr. 01,22
Horn Antenna 2	ETS-LINDGREN	3117	00168692	Apr. 01,22	Mar. 31,23
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
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. 25,21	Feb. 24,22
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 24,22	Feb. 23,23
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 01,22	May. 31,23
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 03,21	Jun. 02,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,22	Jun. 01,23
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 22,21	Apr. 21,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 21,22	Apr. 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	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 02,22	Jun. 01,23
Power Meter	Anritsu	ML2495A	1506002	Apr. 07,21	Apr. 06,22
Power Meter	Anritsu	ML2495A	1506002	Apr. 06,22	Apr. 05,23
Power Sensor	Anritsu	MA2411B	1339352	May. 07,21	May. 06,22
Power Sensor	Anritsu	MA2411B	1339352	May. 06,22	May. 05,23
Temperature Chamber	ESPEC	SH-242	93000855	Jun. 02,21	Jun. 01,22
Temperature Chamber	ESPEC	SH-242	93000855	Jun. 01,22	May. 31,23

MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Mar. 05,21	Mar. 04,22
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Mar. 04,22	Mar. 03,23
Power Divider	MCLI/USA	PS2-15	24880	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months or 36 months 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	Multi-band GSM/WCDMA/LTE phone with Bluetooth&WLAN	
BRAND NAME	NOKIA	
MODEL NAME	TA-1412	
NOMINAL VOLTAGE	5.0Vdc(adapter or host equipment) 3.85Vdc (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**	535.80mW
	EDGE	122.46mW
	WCDMA	77.98mW
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	69.02mW
	LTE Band 5 (Channel Bandwidth: 3MHz)	68.23mW
	LTE Band 5 (Channel Bandwidth: 5MHz)	68.55mW
	LTE Band 5 (Channel Bandwidth: 10MHz)	69.18mW
EMISSION DESIGNATORGOGN	**GSM/GPRS**	248KGXW
	EDGE	256KG7W
	WCDMA	4M18F9W
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	QPSK: 1M12G7D
		16QAM: 1M12W7D
		64QAM: 1M11W7D
	LTE Band 5 (Channel Bandwidth: 3MHz)	QPSK: 2M77G7D
		16QAM: 2M77W7D

		64QAM: 2M77W7D
	LTE Band 5 (Channel Bandwidth: 5MHz)	QPSK: 4M58G7D
		16QAM: 4M57W7D
		64QAM: 4M56W7D
	LTE Band 5 (Channel Bandwidth: 10MHz)	QPSK: 9M10G7D
		16QAM: 9M08W7D
		64QAM:9M07W7D
ANTENNA TYPE	Fixed Internal Antenna with -2.9dBi gain for GSM850/ WCDMA V/LTE B5	
HW VERSION	19655-1-11M12	
SW VERSION	00WW_1_520	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	USB1 cable: unshielded without ferrite, 1.0meter USB2 cable: unshielded without ferrite, 1.0meter Earphone1: non-shielded cable, with w/o ferrite core, 1.2 meter	
EXTREME TEMPERATURE	0- 40 ℃	
EXTREME VOLTAGE	3.5V - 4.4V	

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
GSM/GPRS/EDGE	1TX/1RX
WCDMA	1TX/1RX
LTE	1TX/1RX

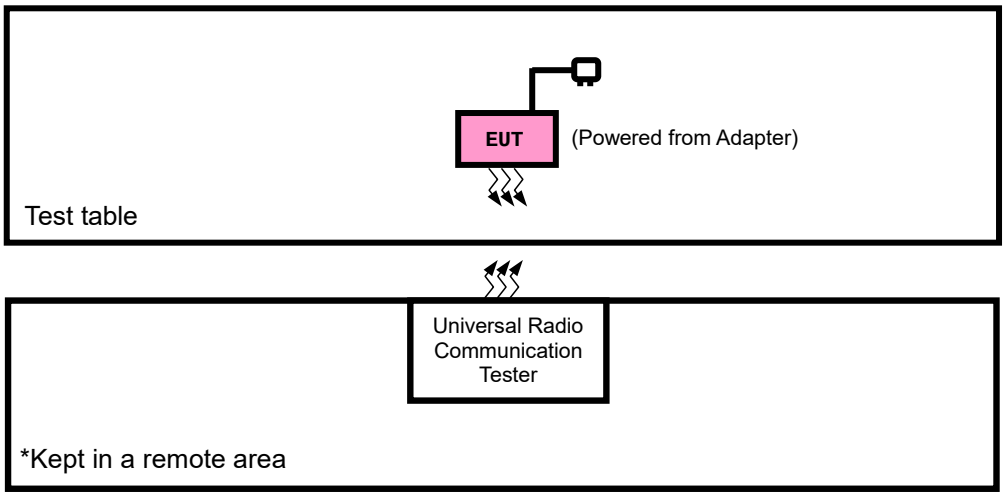
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery	Nokia	Hunan Gaoyuan Battery Co., Ltd.	WT341	Capacity：3.85 Vdc, 4900mAh
AC Adapter 1	Nokia	ShenZhenBaiJunDa ElectronicCO.,LTD.	AD-010U	I/P: 100-240Vac, 0.35A, O/P: 5.0Vdc, 2.0A
AC Adapter 2	Nokia	SHENZHEN TIANYIN ELECTRONICS CO., LTD.	CH-21U	I/P: 100-240Vac, 0.3A, O/P: 5.0Vdc, 2.0A
AC Adapter 3	Nokia	YuTong Electronics(HuiZhou) Co.,Ltd	PA-US5V2A-03 6	I/P: 100-240Vac, 0.5A, O/P: 5.0Vdc, 2.0A
Earphone 1	Nokia	Guangdong Wivtak Technology Co., Ltd.	HS-34	Signal Line, 1.2meter
USB Cable 1	Nokia	HUIZHOU WASHIN ELECTRONICS CO.,LTD	CB-36A	Signal Line, 1.0meter
USB Cable 2	Nokia	Saibao(Jiangi) Communication Industial Co.,Ltd	AC-2A	Signal Line, 1.0meter

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/WCDMA /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	FREQUENCY STABILITY	128 to 251	128, 251	GSM,EDGE
A	OCCUPIED BANDWIDTH	128 to 251	128, 189, 251	GSM,EDGE
A	BAND EDGE	128 to 251	128, 251	GSM,EDGE
A	CONDCUDETED EMISSION	128 to 251	128, 189, 251	GSM,EDGE
A	RADIATED EMISSION	128 to 251	128, 189, 251	GSM,EDGE
A	PEAK TO AVERAGE RATIO	128 to 251	128, 189, 251	GSM,EDGE

WCDMA MODE

`

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
A	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
A	FREQUENCY STABILITY	4132 to 4233	4132, 4233	WCDMA
A	OCCUPIED BANDWIDTH	4132 to 4233	4132, 4182, 4233	WCDMA
A	BAND EDGE	4132 to 4233	4132, 4182, 4233	WCDMA
A	CONDCUDETED EMISSION	4132 to 4233	4132, 4233	WCDMA
A	RADIATED EMISSION	4132 to 4233	4132, 4182, 4233	WCDMA
A	PEAK TO AVERAGE RATIO	4132 to 4233	4132, 4182, 4233	WCDMA

LTE BAND 5 MODE

TEST ITEM	Available Channel	Tested Channel	Channel bandwidth	modulation	mode
ERP	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
FREQUENCY STABILITY	20407 to 20643	20407, 20643	1.4MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20415 to 20635	20415, 20635	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20425 to 20625	20425, 20625	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20450 to 20600	20450, 20600	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
OCCUPIED BANDWIDTH	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM,64QAM	6 RB / 0 RB Offset
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	15 RB / 0 RB Offset
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	25 RB / 0 RB Offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	50 RB / 0 RB Offset
BAND EDGE	20407 to 20643	20407	1.4 MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
					6 RB / 0 RB Offset
	20407 to 20643	20643	1.4 MHz	QPSK,16QAM,64QAM	1 RB / 5 RB Offset
					6 RB / 0 RB Offset
	20415 to 20635	20415	3 MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
					15 RB / 0 RB Offset
	20415 to 20635	20635	3 MHz	QPSK,16QAM,64QAM	1 RB / 14 RB Offset
					15 RB / 0 RB Offset
	20425 to 20625	20425	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
					25 RB / 0 RB Offset
	20425 to 20625	20625	5MHz	QPSK,16QAM,64QAM	1 RB / 24 RB Offset
					25 RB / 0 RB Offset
	20450 to 20600	20450	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
					50 RB / 0 RB Offset
	20450 to 20600	20600	10MHz	QPSK,16QAM,64QAM	1 RB / 49 RB Offset
					50 RB / 0 RB Offset

CONDCUDETED EMISSION	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
RADIATED EMISSION	20407 to 20643	20525	1.4MHz	QPSK	1 RB / 0 RB Offset
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK	1 RB / 0 RB Offset
	20425 to 20625	20525	5MHz	QPSK	1 RB / 0 RB Offset
	20450 to 20600	20525	10MHz	QPSK	1 RB / 0 RB Offset
PEAK TO AVERAGE RATIO	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM,64QAM	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 5V By Adapter	Jace Hu
FREQUENCY STABILITY	23deg. C, 70%RH	DC5V By Adapter	James Fu
OCCUPIED BANDWIDTH	23deg. C, 70%RH	DC5V By Adapter	James Fu
BAND EDGE	23deg. C, 70%RH	DC 5V By Adapter	James Fu
CONDCUDETED EMISSION	23deg. C, 70%RH	DC5V By Adapter	James Fu
RADIATED EMISSION	23deg. C, 70%RH	DC5V By Adapter	Jace Hu
PEAK TO AVERAGE RATIO	23deg. C, 70%RH	DC 3.85V By Battery	James Fu

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.

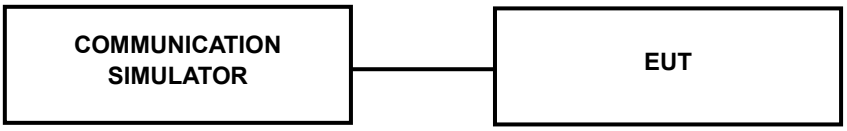
CONDUCTED POWER MEASUREMENT:

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)

Band	GSM850		
Channel	128	189	251
Frequency	824.2	836.4	848.8
GSM (GMSK, 1Tx-slot)	32.31	32.22	32.22
GPRS (GMSK, 1Tx-slot)	32.34	32.25	32.26
GPRS (GMSK, 2Tx-slot)	30.25	30.31	30.12
GPRS (GMSK, 3Tx-slot)	28.27	28.23	28.21
GPRS (GMSK, 4Tx-slot)	26.04	26.17	26.07
EDGE (8PSK, 1Tx-slot)	25.85	25.88	25.93
EDGE (8PSK, 2Tx-slot)	25.01	25.01	25.13
EDGE (8PSK, 3Tx-slot)	22.20	22.26	22.30
EDGE (8PSK, 4Tx-slot)	19.72	19.74	19.89

Band	WCDMA V		
Channel	4132	4182	4233
Frequency	826.4	836.4	846.6
RMC 12.2K	23.86	23.97	23.90
HSDPA Subtest-1	22.89	22.87	22.90
HSDPA Subtest-2	22.83	22.86	22.85
HSDPA Subtest-3	22.33	22.35	22.35
HSDPA Subtest-4	22.31	22.29	22.30
DC-HSDPA Subtest-1	22.81	22.82	22.85
DC-HSDPA Subtest-2	22.78	22.85	22.80
DC-HSDPA Subtest-3	22.25	22.31	22.34
DC-HSDPA Subtest-4	22.35	22.33	22.35
HSUPA Subtest-1	22.81	22.89	22.92
HSUPA Subtest-2	20.78	20.95	20.85
HSUPA Subtest-3	21.75	21.84	21.86
HSUPA Subtest-4	20.70	20.83	20.80
HSUPA Subtest-5	22.77	22.84	22.86
HSPA+ Subtest-1	20.27	20.40	20.38

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	23.44	23.20	23.33
		1	2	23.22	23.12	23.23
		1	5	23.40	23.19	23.30
		3	0	23.22	23.09	23.22
		3	1	23.21	23.10	23.17
		3	3	23.28	23.22	23.29
		6	0	22.83	22.70	22.83
	16QAM	1	0	22.64	22.56	22.56
		1	2	22.67	22.64	22.67
		1	5	22.66	22.63	22.73
		3	0	22.14	22.00	22.16
		3	1	22.08	21.93	22.04
		3	3	22.16	22.15	22.19
		6	0	21.07	20.97	21.04
	64QAM	1	0	21.63	21.45	21.51
		1	2	21.50	21.45	21.52
		1	5	21.70	21.49	21.56
		3	0	20.90	20.90	20.93
		3	1	20.96	20.94	20.97
		3	3	21.05	20.82	21.00
		6	0	20.01	19.95	20.00

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	23.39	23.19	23.30
		1	7	23.20	23.14	23.26
		1	14	23.34	23.25	23.26
		8	0	22.69	22.66	22.71
		8	3	22.71	22.60	22.64
		8	7	22.78	22.72	22.82
		15	0	22.82	22.70	22.80
	16QAM	1	0	22.68	22.50	22.60
		1	7	22.66	22.65	22.64
		1	14	22.71	22.59	22.76
		8	0	21.14	21.01	21.13
		8	3	21.10	20.91	21.10
		8	7	21.21	21.15	21.17
		15	0	21.07	20.97	20.99
	64QAM	1	0	21.66	21.44	21.54
		1	7	21.53	21.45	21.50
		1	14	21.70	21.49	21.57
		8	0	19.90	19.92	19.96
		8	3	20.00	19.88	20.02
		8	7	20.02	19.86	19.96
		15	0	20.03	19.92	20.04

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	23.41	23.21	23.30
		1	12	23.19	23.18	23.23
		1	24	23.38	23.22	23.31
		12	0	22.71	22.65	22.68
		12	6	22.68	22.60	22.70
		12	13	22.78	22.71	22.79
		25	0	22.85	22.67	22.82
	16QAM	1	0	22.62	22.52	22.53
		1	12	22.68	22.67	22.63
		1	24	22.67	22.60	22.76
		12	0	21.10	21.01	21.13
		12	6	21.09	20.94	21.10
		12	13	21.14	21.15	21.19
		25	0	21.04	21.04	21.03
	64QAM	1	0	21.63	21.45	21.48
		1	12	21.50	21.46	21.55
		1	24	21.68	21.52	21.50
		12	0	19.92	19.94	19.98
		12	6	19.94	19.95	20.01
		12	13	20.06	19.85	19.93
		25	0	19.99	19.98	20.02

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	23.45	23.26	23.35
		1	24	23.27	23.19	23.28
		1	49	23.42	23.27	23.32
		25	0	22.77	22.67	22.73
		25	12	22.75	22.65	22.72
		25	25	22.86	22.73	22.84
		50	0	22.87	22.75	22.84
	16QAM	1	0	22.70	22.58	22.61
		1	24	22.74	22.69	22.69
		1	49	22.74	22.65	22.78
		25	0	21.16	21.08	21.18
		25	12	21.16	20.99	21.12
		25	25	21.22	21.17	21.25
		50	0	21.12	21.05	21.05
	64QAM	1	0	21.67	21.50	21.56
		1	24	21.58	21.47	21.57
		1	49	21.72	21.57	21.58
		25	0	19.98	19.96	20.01
		25	12	20.02	19.96	20.03
		25	25	20.10	19.90	20.01
		50	0	20.05	20.00	20.05

ERP POWER (dBm)

GSM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
128	824.2	32.34	-2.9	27.29	535.80	7
189	836.4	32.25	-2.9	27.2	524.81	7
251	848.8	32.26	-2.9	27.21	526.02	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	25.85	-2.9	20.8	120.23	7
189	836.4	25.88	-2.9	20.83	121.06	7
251	848.8	25.93	-2.9	20.88	122.46	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	23.86	-2.9	18.81	76.03	7
4182	836.4	23.97	-2.9	18.92	77.98	7
4233	846.6	23.9	-2.9	18.85	76.74	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	23.44	-2.9	18.39	69.02	7
20525	836.5	23.22	-2.9	18.17	65.61	7
20643	848.3	23.33	-2.9	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	22.67	-2.9	17.62	57.81	7
20525	836.5	22.64	-2.9	17.59	57.41	7
20643	848.3	22.73	-2.9	17.68	58.61	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	21.7	-2.9	16.65	46.24	7
20525	836.5	21.49	-2.9	16.44	44.06	7
20643	848.3	21.56	-2.9	16.51	44.77	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	23.39	-2.9	18.34	68.23	7
20525	836.5	23.25	-2.9	18.2	66.07	7
20635	847.5	23.3	-2.9	18.25	66.83	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	22.71	-2.9	17.66	58.34	7
20525	836.5	22.65	-2.9	17.6	57.54	7
20635	847.5	22.76	-2.9	17.71	59.02	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	21.7	-2.9	16.65	46.24	7
20525	836.5	21.49	-2.9	16.44	44.06	7
20635	847.5	21.57	-2.9	16.52	44.87	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	23.41	-2.9	18.36	68.55	7
20525	836.5	23.22	-2.9	18.17	65.61	7
20625	846.5	23.31	-2.9	18.26	66.99	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	22.68	-2.9	17.63	57.94	7
20525	836.5	22.67	-2.9	17.62	57.81	7
20625	846.5	22.76	-2.9	17.71	59.02	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	21.68	-2.9	16.63	46.03	7
20525	836.5	21.52	-2.9	16.47	44.36	7
20625	846.5	21.55	-2.9	16.5	44.67	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	23.45	-2.9	18.4	69.18	7
20525	836.5	23.27	-2.9	18.22	66.37	7
20600	844.0	23.35	-2.9	18.3	67.61	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	22.74	-2.9	17.69	58.75	7
20525	836.5	22.69	-2.9	17.64	58.08	7
20600	844.0	22.78	-2.9	17.73	59.29	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	21.72	-2.9	16.67	46.45	7
20525	836.5	21.57	-2.9	16.52	44.87	7
20600	844.0	21.58	-2.9	16.53	44.98	7

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

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

3.2.2 TEST PROCEDURE

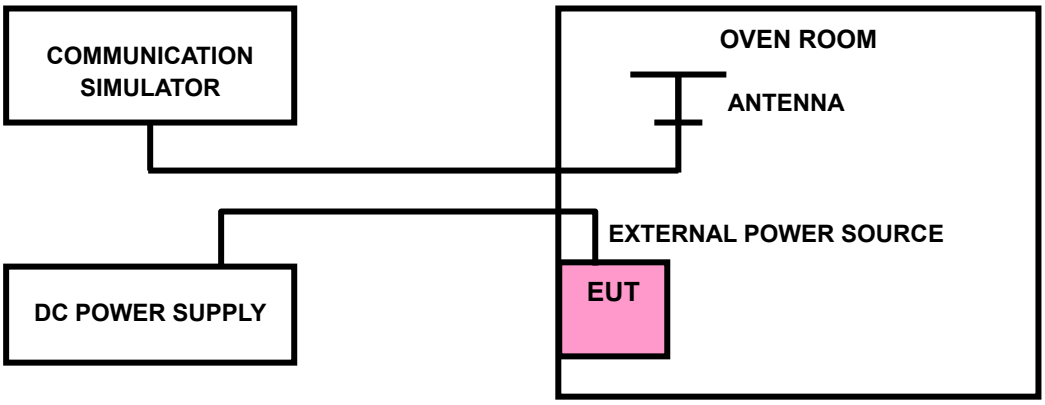
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

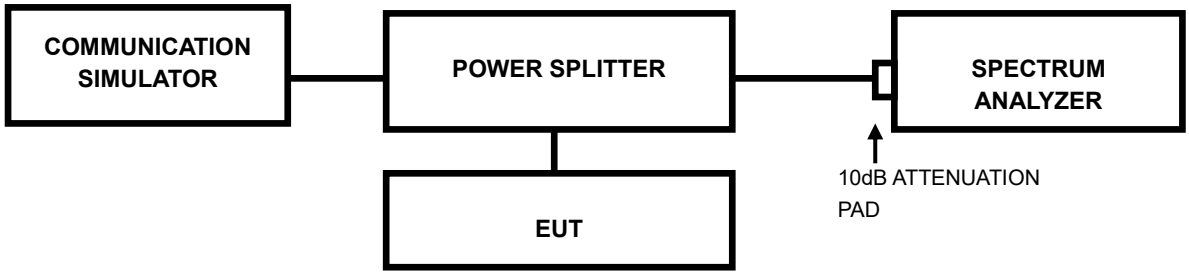
Please Refer to Appendix Of this test report.

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.4 TEST RESULTS

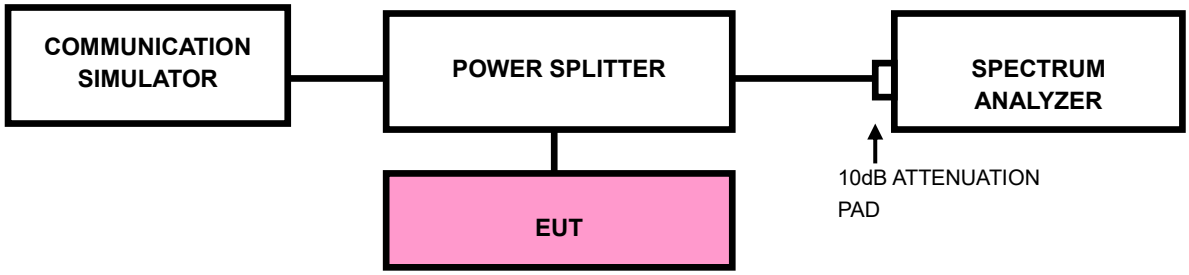
Please Refer to Appendix Of this test report.

3.4 BAND EDGE MEASUREMENT

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

a. All measurements were done at low and high operational frequency range.

b. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/ EDGE/LTE bandwidth for (1.4M/3M/5M/10M/15M/20M)1RB/0RB&1RB/MAXRB).

c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is ≥1%*EBW kHz and VBW of the spectrum is 3*RBW kHz. (LTE bandwidth 1.4M/3M/5M/10M/15M/20MHz).

e. Record the max trace plot into the test report.

3.4.4 TEST RESULTS

Please Refer to Appendix Of this test report.

3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

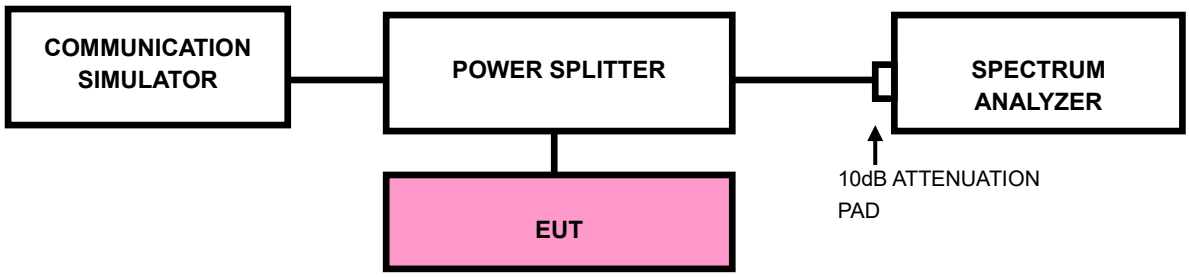
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

3.5.2 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

b. Measuring frequency range is from 9 kHz to 9GHz. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

Please Refer to Appendix Of this test report.

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 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.

3.6.2 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.

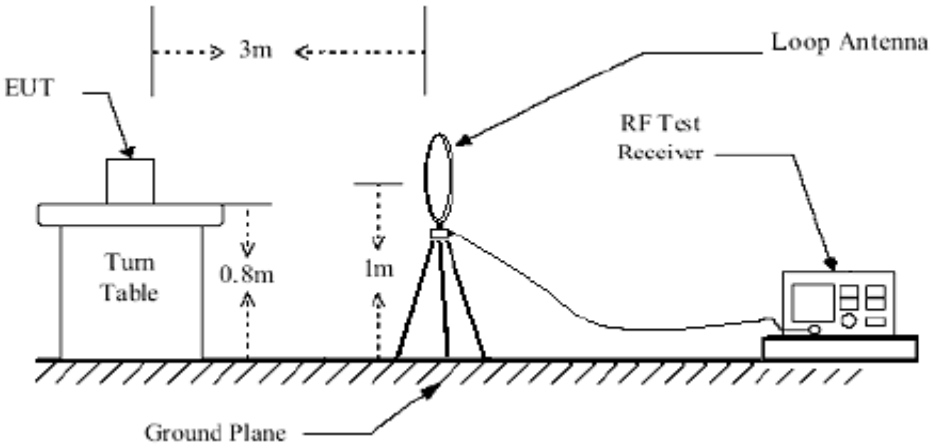
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

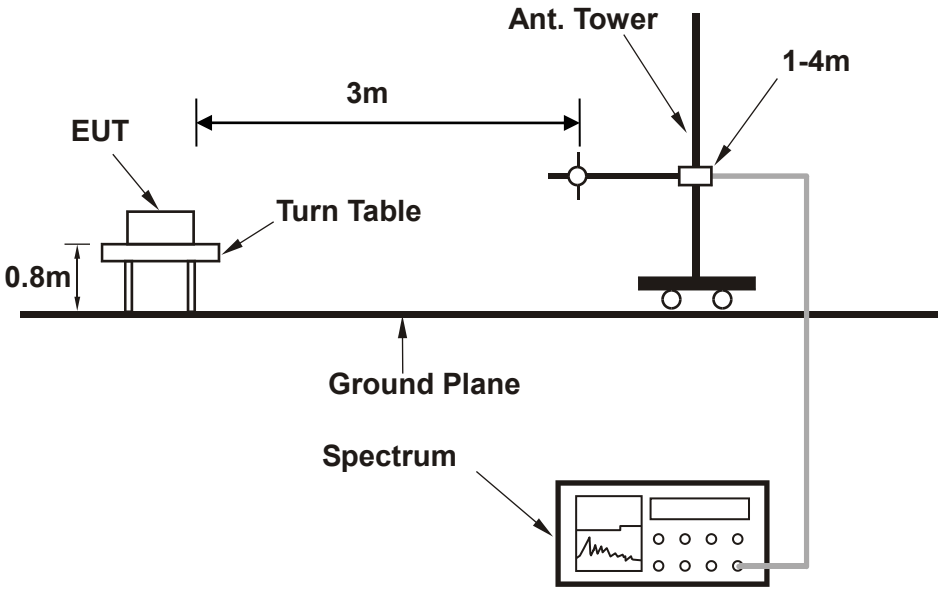
No deviation

3.6.4 TEST SETUP

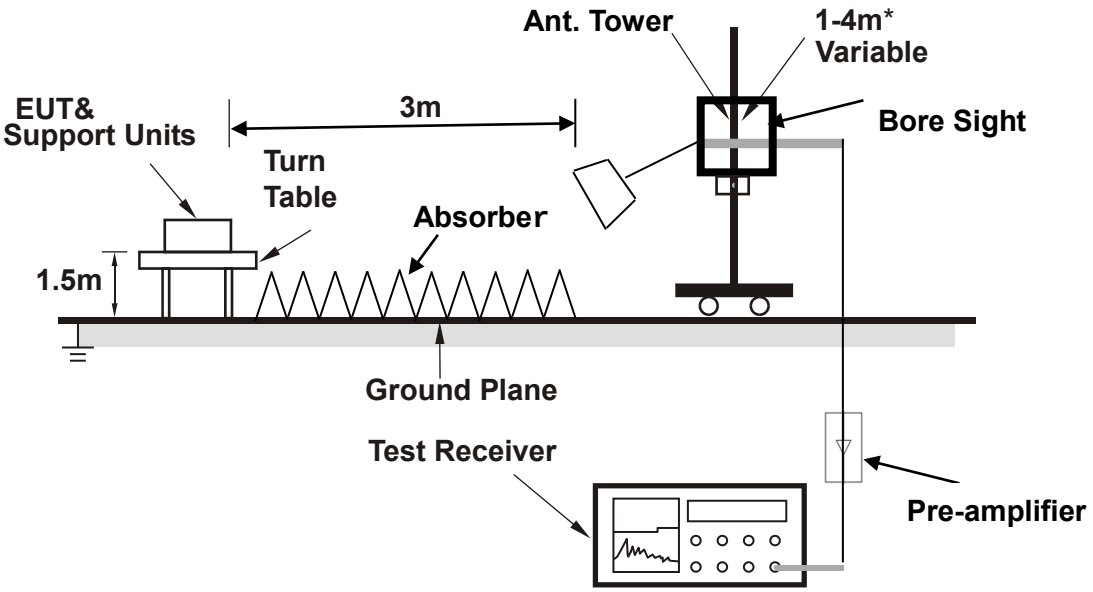
< Frequency Range below 30MHz >



< 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).

3.6.5 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

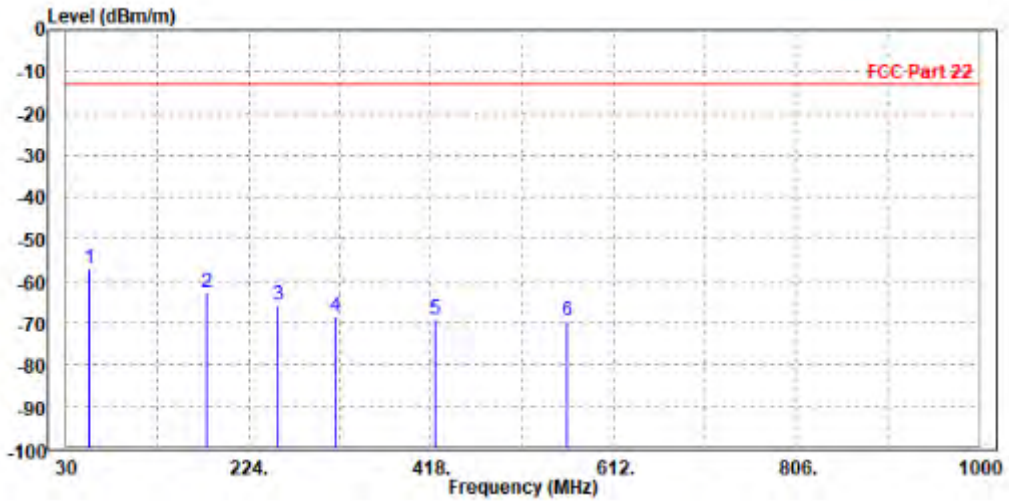
30 MHz – 1GHz data:

GSM850

CHANNEL BANDWIDTH: 128 ~ 251

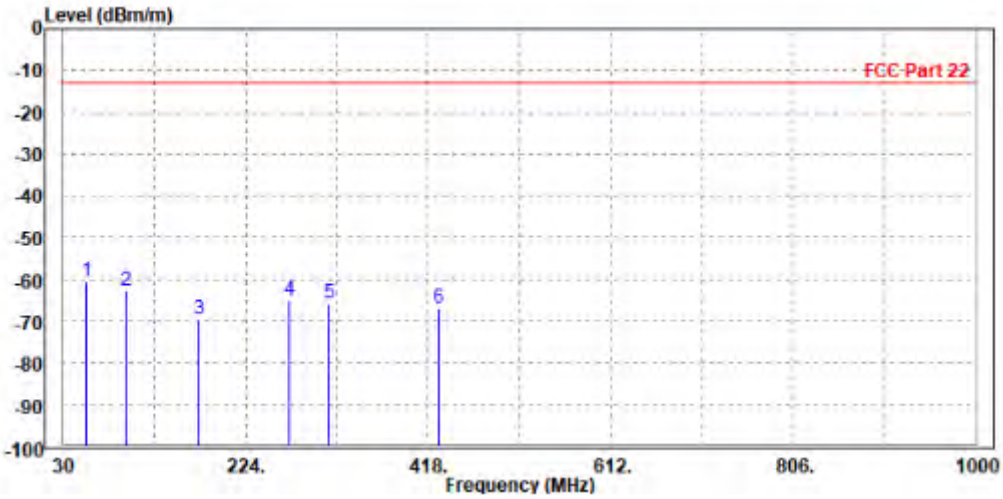
MODE	TX channel 251	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	55.220	-57.07	-39.17	-13.00	-44.07	-17.90	Peak	Horizontal
2	179.380	-62.72	-44.80	-13.00	-49.72	-17.92	Peak	Horizontal
3	255.040	-65.69	-54.14	-13.00	-52.69	-11.55	Peak	Horizontal
4	315.180	-68.38	-56.29	-13.00	-55.38	-12.09	Peak	Horizontal
5	422.850	-69.31	-59.69	-13.00	-56.31	-9.62	Peak	Horizontal
6	562.530	-69.46	-63.84	-13.00	-56.46	-5.62	Peak	Horizontal



MODE	TX channel 251	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	55.220	-60.27	-35.94	-13.00	-47.27	-24.33	Peak	Vertical
2	96.930	-62.82	-53.57	-13.00	-49.82	-9.25	Peak	Vertical
3	173.560	-69.69	-51.64	-13.00	-56.69	-18.05	Peak	Vertical
4	270.560	-65.02	-52.57	-13.00	-52.02	-12.45	Peak	Vertical
5	312.270	-65.90	-55.31	-13.00	-52.90	-10.59	Peak	Vertical
6	428.670	-67.05	-58.31	-13.00	-54.05	-8.74	Peak	Vertical



ABOVE 1GHz DATA

Note:

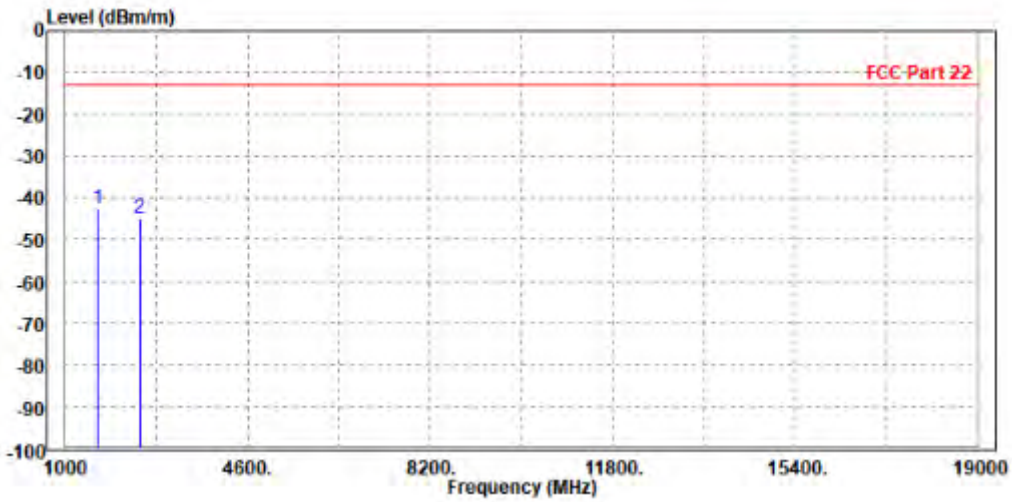
1. The emission in the range of 1 GHz~1.5 GHz was tested 20db below the limit, the data not recorded in the sheet.
2. For higher frequency, the emission is too low to be detected.

GSM 850

CH 128:

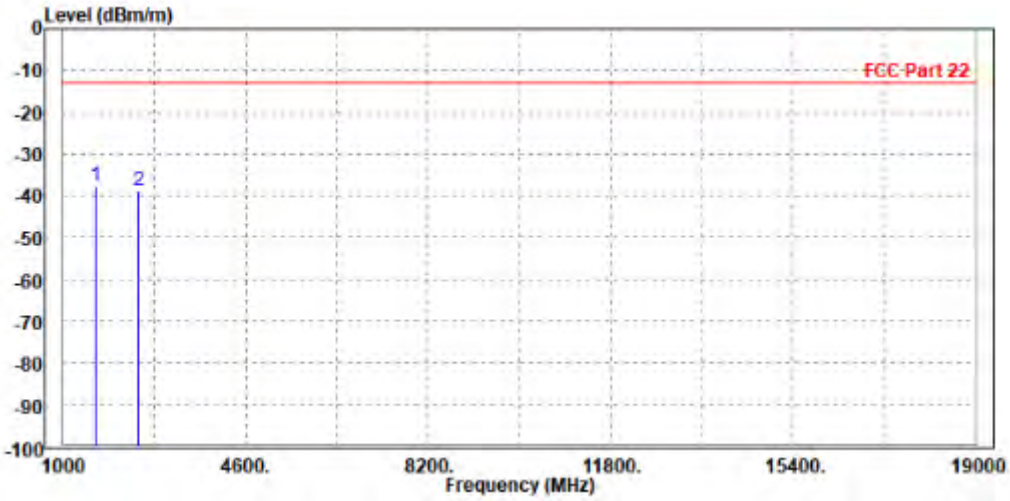
MODE	TX channel 128	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		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	-42.42	-43.19	-13.00	-29.42	0.77	Peak	Horizontal
2		2472.600	-44.83	-50.17	-13.00	-31.83	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			

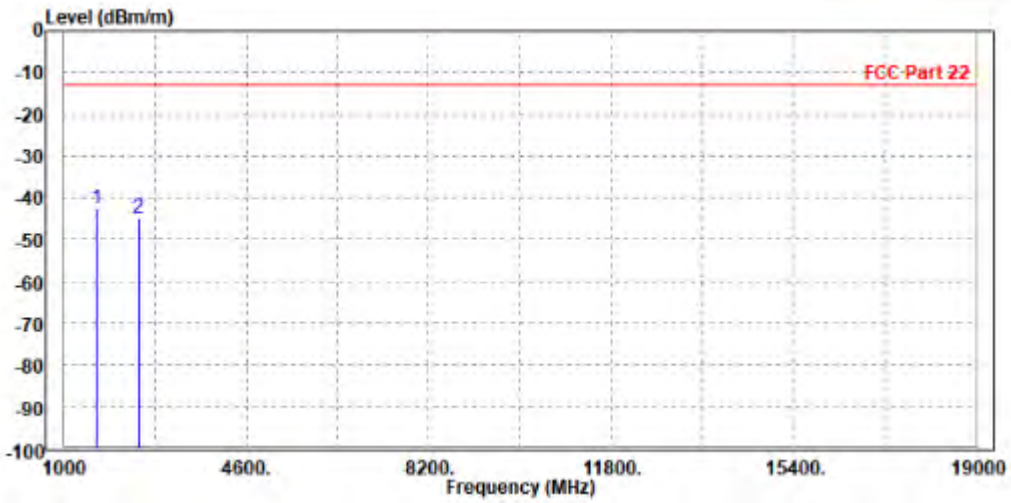
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1648.000	-37.82	-38.86	-13.00	-24.82	1.04	Peak	Vertical
2	2476.000	-38.78	-43.65	-13.00	-25.78	4.87	Peak	Vertical



CH 189:

MODE	TX channel 189	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	-42.42	-43.19	-13.00	-29.42	0.77	Peak	Horizontal
2		2472.600	-44.83	-50.17	-13.00	-31.83	5.34	Peak	Horizontal



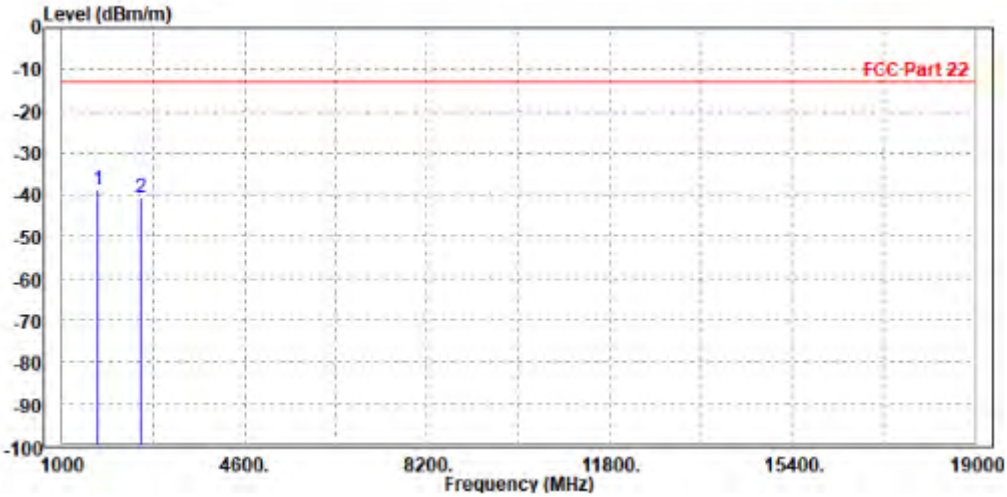
MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	1648.000	-37.82	-38.86	-13.00	-24.82	1.04	Peak	Vertical
2		2476.000	-38.78	-43.65	-13.00	-25.78	4.87	Peak	Vertical

CH 251:

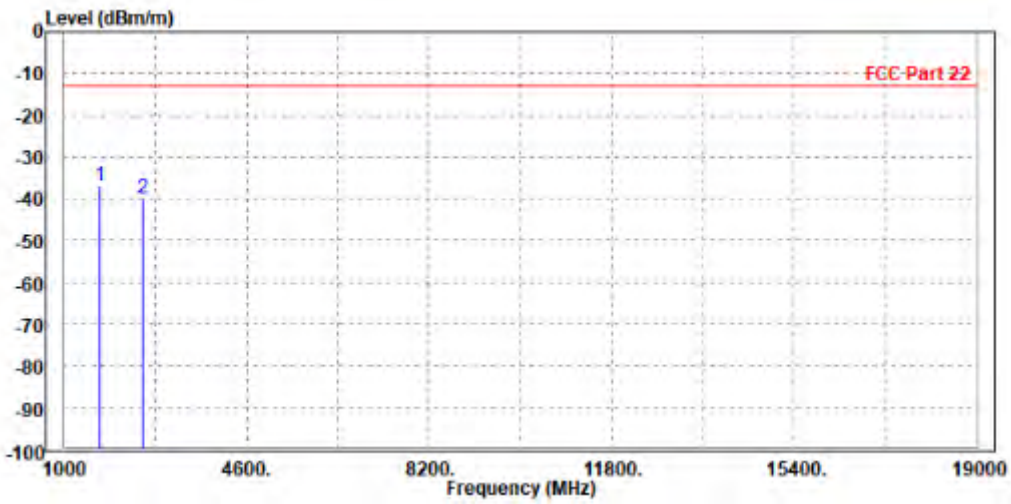
MODE	TX channel 251	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1702.000	-38.86	-40.07	-13.00	-25.86	1.21	Peak	Horizontal
2	2548.000	-40.53	-46.08	-13.00	-27.53	5.55	Peak	Horizontal



MODE	TX channel 251	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			

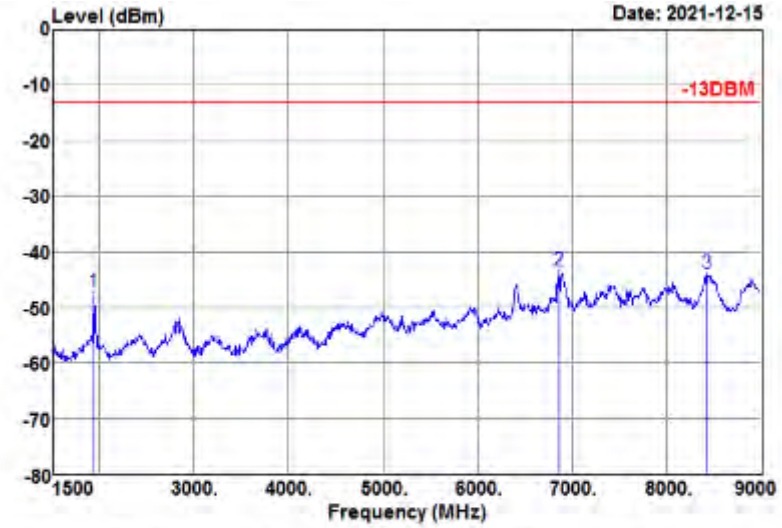
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1 PP	1702.000	-36.81	-38.24	-13.00	-23.81	1.43	Peak	Vertical
2	2548.000	-40.00	-45.09	-13.00	-27.00	5.09	Peak	Vertical



EDGE 850

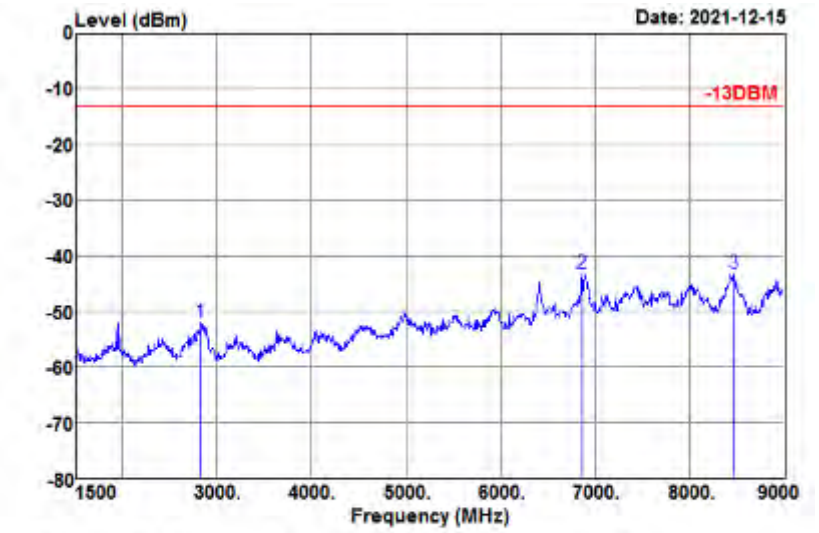
CH 128:

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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1942.500	-54.48	7.39	-47.09	-13.00	-34.09	Peak
6862.500	-61.42	17.95	-43.47	-13.00	-30.47	Peak
8437.500	-63.24	19.26	-43.98	-13.00	-30.98	Peak

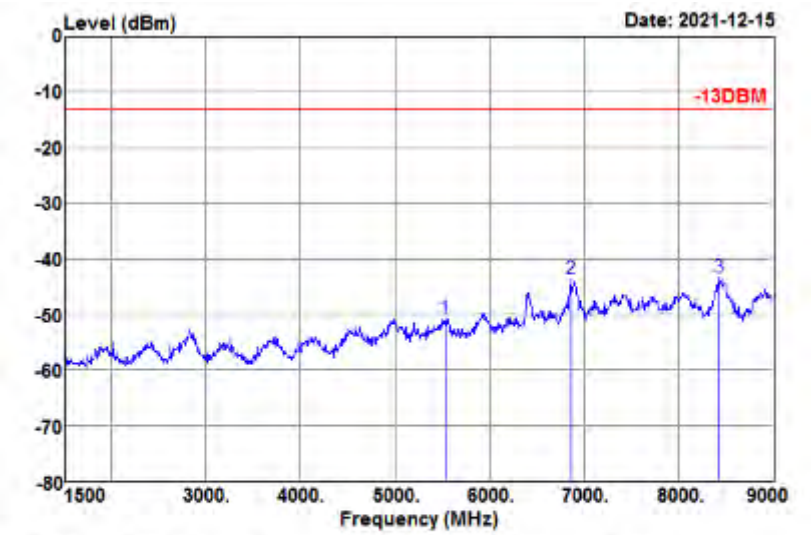
MODE	TX channel 128	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-59.96	8.03	-51.93	-13.00	-38.93	Peak
6862.500	-61.67	18.38	-43.29	-13.00	-30.29	Peak
8475.000	-62.61	19.54	-43.07	-13.00	-30.07	Peak

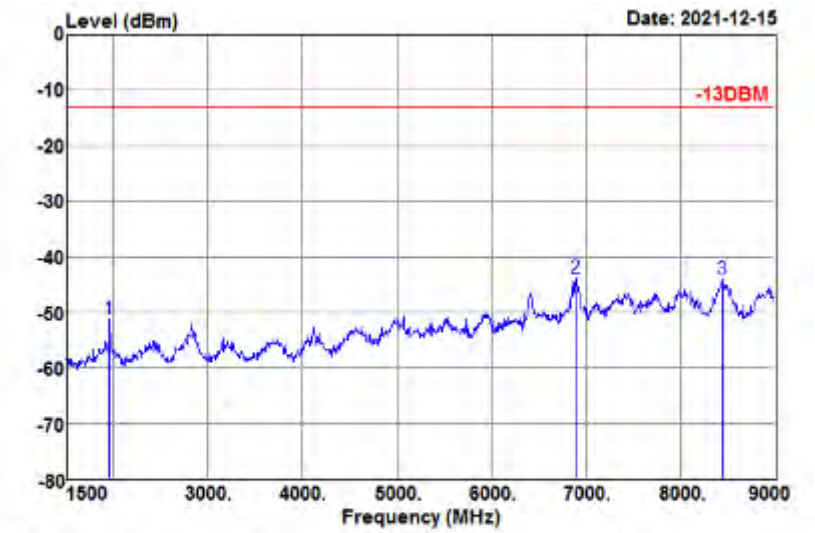
CH 189:

MODE	TX channel 189	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
5527.500	-63.93	13.23	-50.70	-13.00	-37.70	Peak
6862.500	-61.52	17.95	-43.57	-13.00	-30.57	Peak
8430.000	-62.75	19.25	-43.50	-13.00	-30.50	Peak

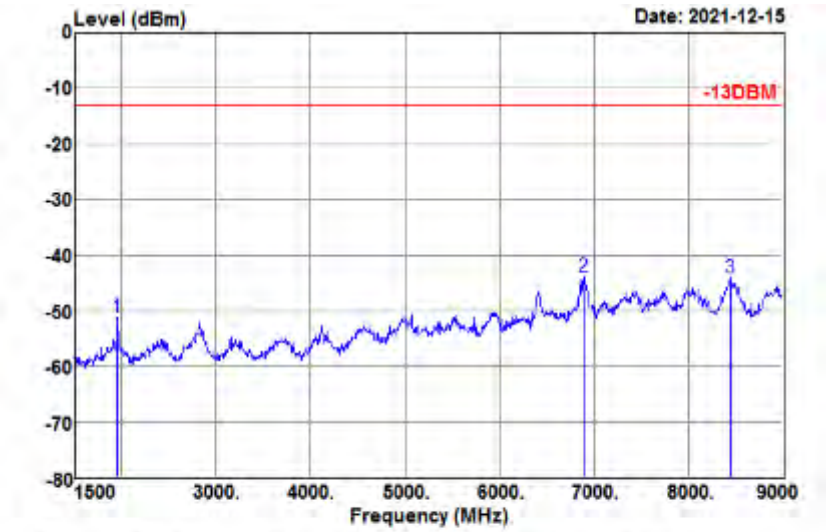
MODE	TX channel 189	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1957.500	-58.59	7.42	-51.17	-13.00	-38.17	Peak
6892.500	-61.96	18.08	-43.88	-13.00	-30.88	Peak
8445.000	-63.49	19.26	-44.23	-13.00	-31.23	Peak

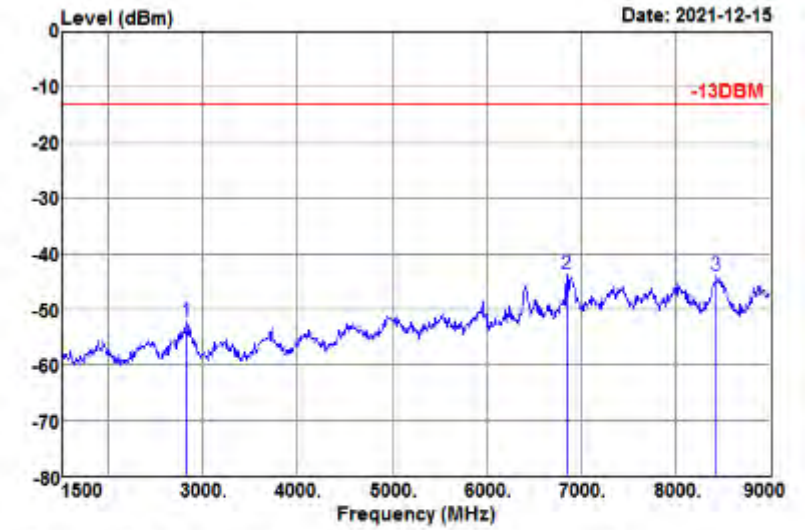
CH 251:

MODE	TX channel 251	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1957.500	-58.59	7.42	-51.17	-13.00	-38.17	Peak
6892.500	-61.96	18.08	-43.88	-13.00	-30.88	Peak
8445.000	-63.49	19.26	-44.23	-13.00	-31.23	Peak

MODE	TX channel 251	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			

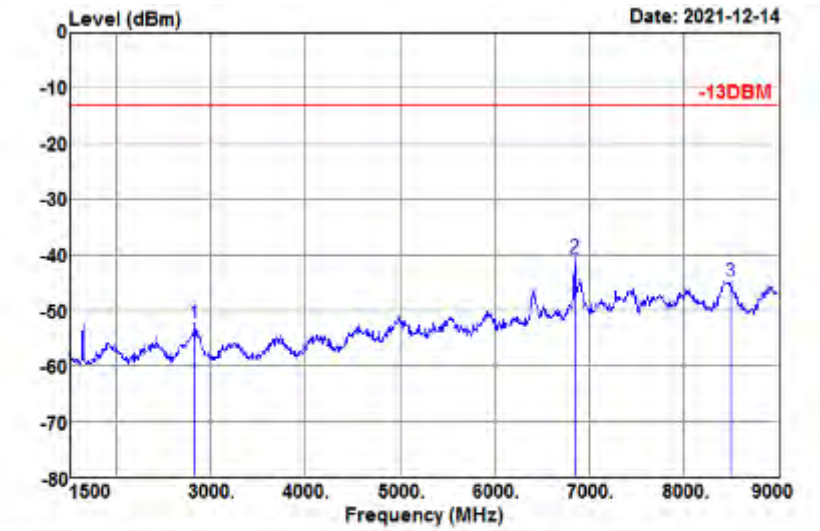


Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-60.28	8.03	-52.25	-13.00	-39.25	Peak
6855.000	-61.97	18.35	-43.62	-13.00	-30.62	Peak
8437.500	-63.47	19.53	-43.94	-13.00	-30.94	Peak

WCDMA Band V

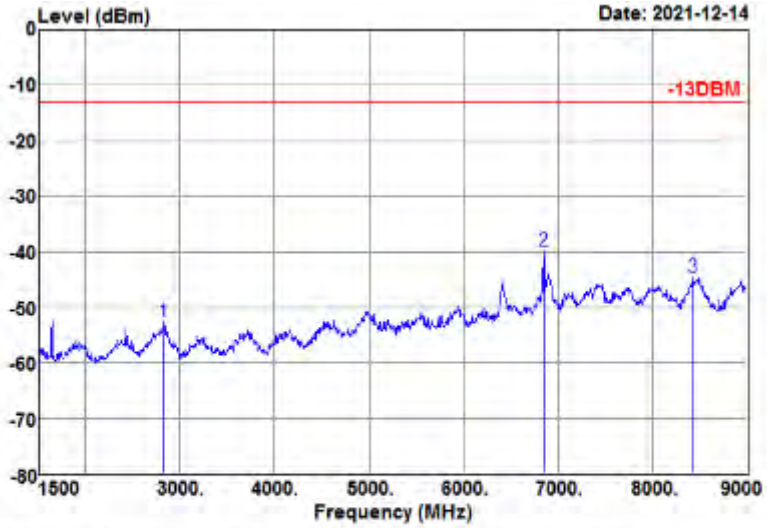
CH 4132:

MODE	TX channel 4132	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-59.99	7.70	-52.29	-13.00	-39.29	Peak
6847.500	-58.45	17.89	-40.56	-13.00	-27.56	Peak
8497.500	-64.18	19.27	-44.91	-13.00	-31.91	Peak

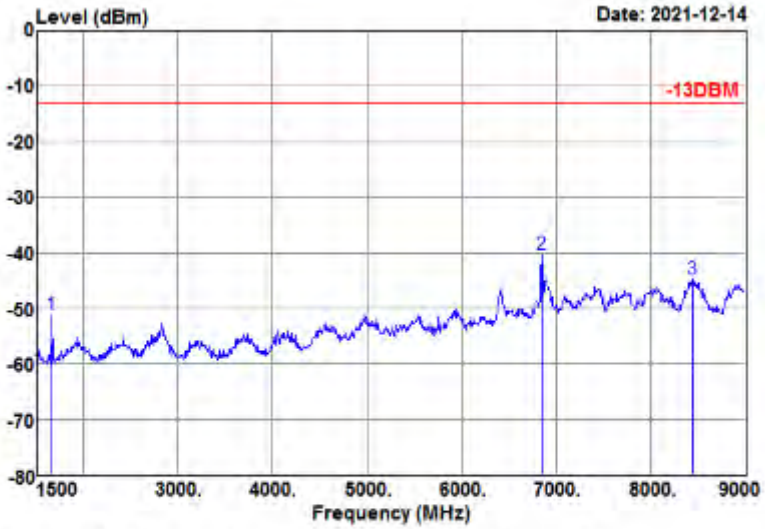
MODE	TX channel 4132	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-60.63	8.03	-52.60	-13.00	-39.60	Peak
6855.000	-58.19	18.35	-39.84	-13.00	-26.84	Peak
8430.000	-64.20	19.53	-44.67	-13.00	-31.67	Peak

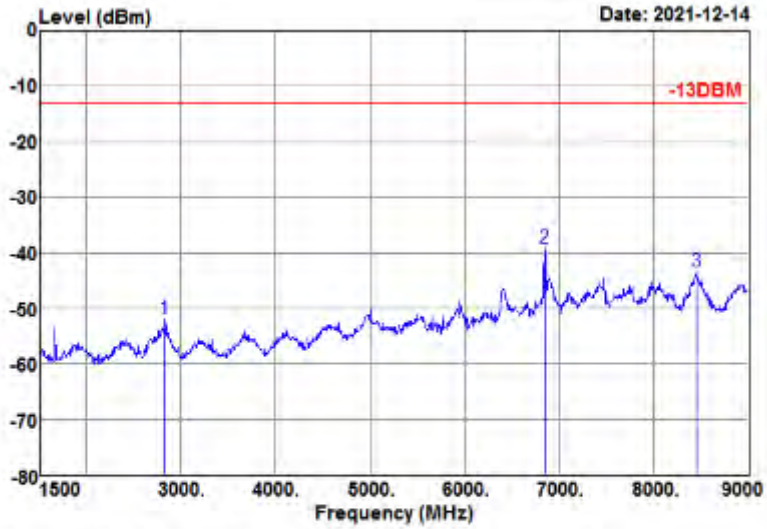
CH 4182:

MODE	TX channel 4182	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1672.500	-57.49	6.24	-51.25	-13.00	-38.25	Peak
6855.000	-58.27	17.92	-40.35	-13.00	-27.35	Peak
8445.000	-64.11	19.26	-44.85	-13.00	-31.85	Peak

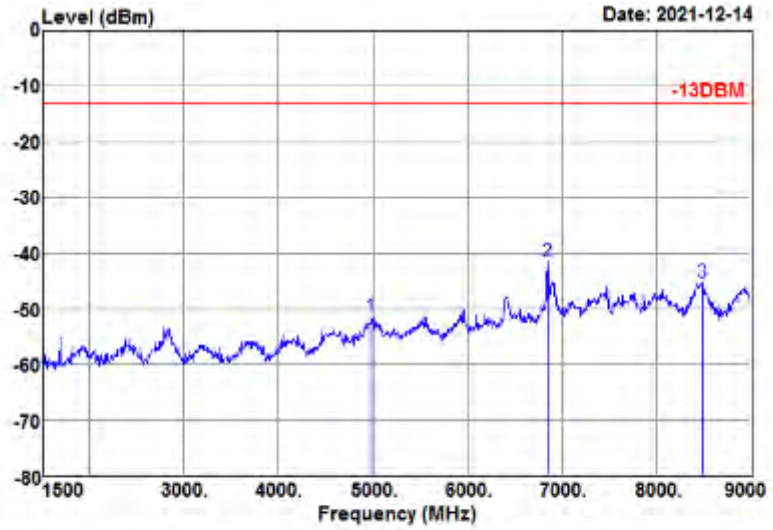
MODE	TX channel 4182	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-59.90	8.03	-51.87	-13.00	-38.87	Peak
6855.000	-57.44	18.35	-39.09	-13.00	-26.09	Peak
8452.500	-62.84	19.54	-43.30	-13.00	-30.30	Peak

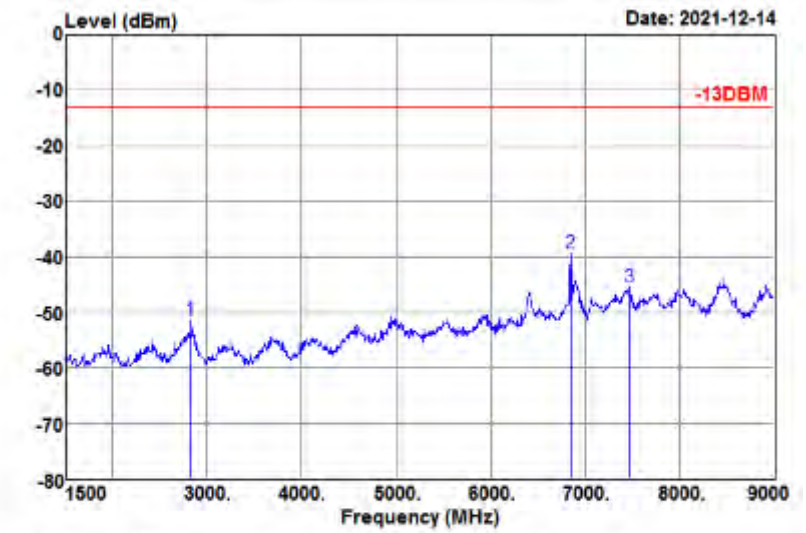
CH 4233:

MODE	TX channel 4233	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
4980.000	-63.97	12.44	-51.53	-13.00	-38.53	Peak
6855.000	-59.45	17.92	-41.53	-13.00	-28.53	Peak
8490.000	-64.51	19.27	-45.24	-13.00	-32.24	Peak

MODE	TX channel 4233	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			

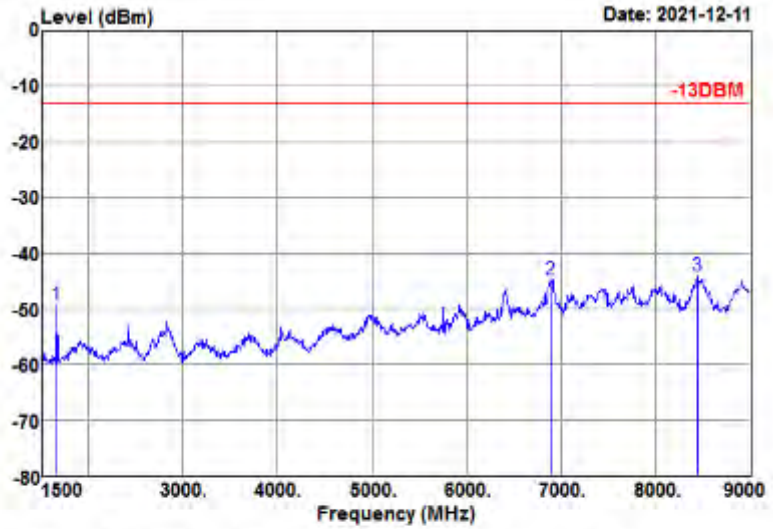


Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-59.48	8.03	-51.45	-13.00	-38.45	Peak
6847.500	-57.62	18.32	-39.30	-13.00	-26.30	Peak
7477.500	-66.44	21.02	-45.42	-13.00	-32.42	Peak

LTE Band 5

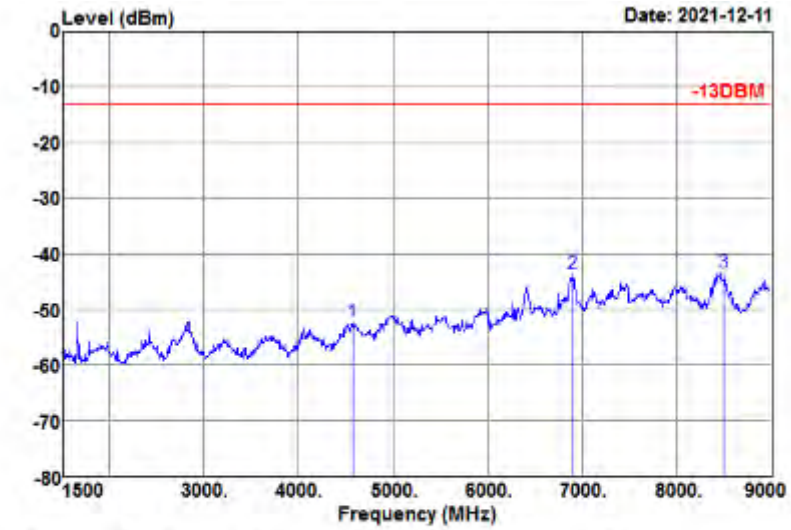
CHANNEL BANDWIDTH: 1.4MHz / QPSK

MODE	TX channel 20525	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1665.000	-55.41	6.19	-49.22	-13.00	-36.22	Peak
6892.500	-62.81	18.08	-44.73	-13.00	-31.73	Peak
8445.000	-63.40	19.26	-44.14	-13.00	-31.14	Peak

MODE	TX channel 20525	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			

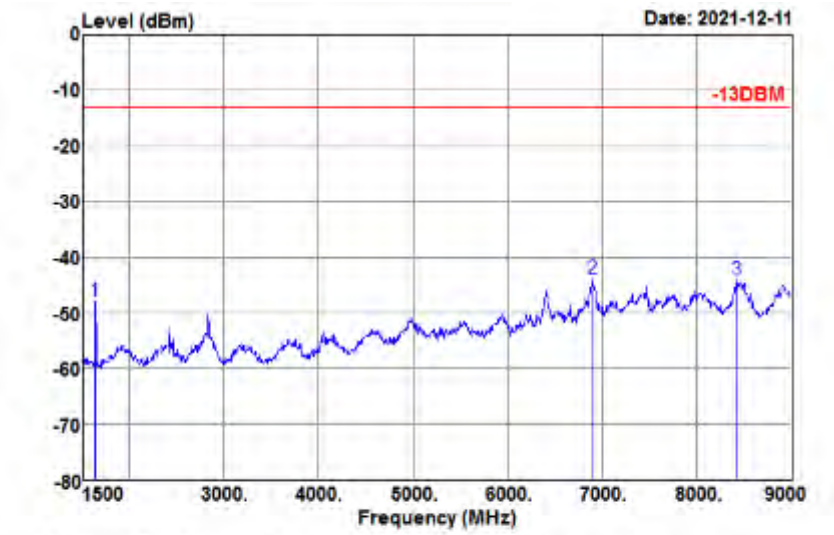


Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
4575.000	-64.13	11.84	-52.29	-13.00	-39.29	Peak
6900.000	-62.25	18.53	-43.72	-13.00	-30.72	Peak
8505.000	-62.97	19.55	-43.42	-13.00	-30.42	Peak

CHANNEL BANDWIDTH: 3MHz / QPSK

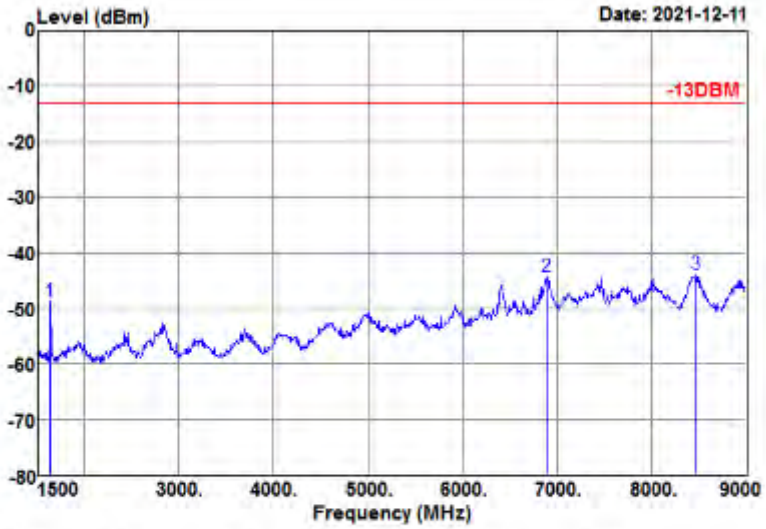
CH20415:

MODE	TX channel 20415	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1642.500	-54.04	6.05	-47.99	-13.00	-34.99	Peak
6900.000	-61.91	18.11	-43.80	-13.00	-30.80	Peak
8437.500	-63.29	19.26	-44.03	-13.00	-31.03	Peak

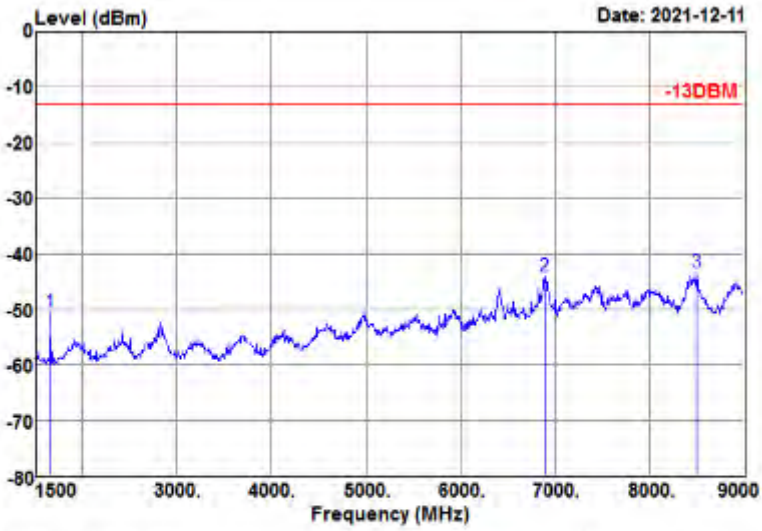
MODE	TX channel 20415	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1642.500	-55.25	6.38	-48.87	-13.00	-35.87	Peak
6892.500	-62.81	18.50	-44.31	-13.00	-31.31	Peak
8475.000	-63.40	19.54	-43.86	-13.00	-30.86	Peak

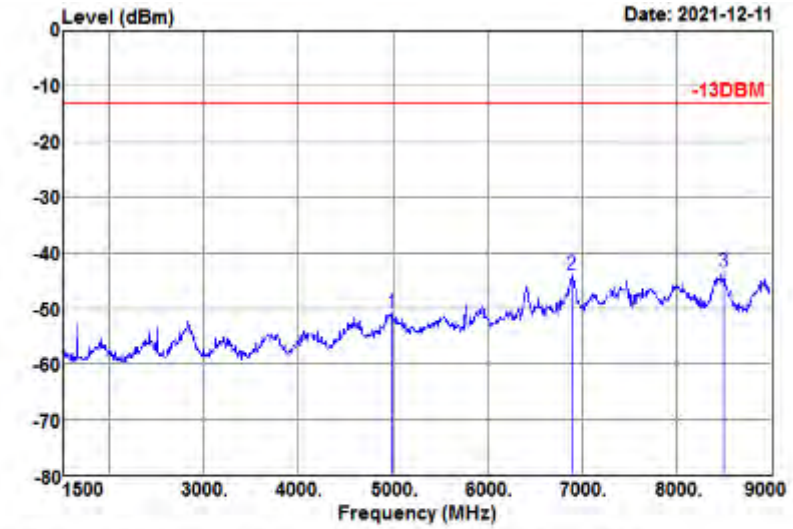
CH20525:

MODE	TX channel 20525	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1665.000	-56.74	6.19	-50.55	-13.00	-37.55	Peak
6892.500	-62.27	18.08	-44.19	-13.00	-31.19	Peak
8505.000	-62.78	19.28	-43.50	-13.00	-30.50	Peak

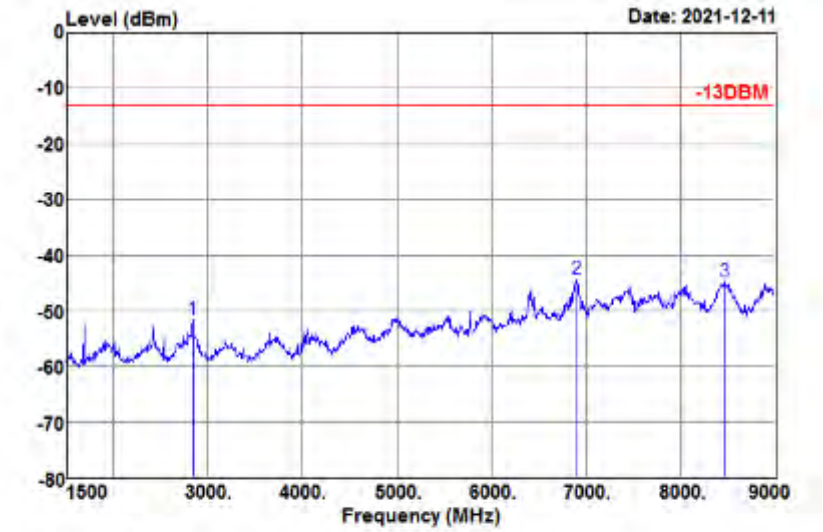
MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
4987.500	-63.59	12.86	-50.73	-13.00	-37.73	Peak
6892.500	-62.36	18.50	-43.86	-13.00	-30.86	Peak
8505.000	-62.97	19.55	-43.42	-13.00	-30.42	Peak

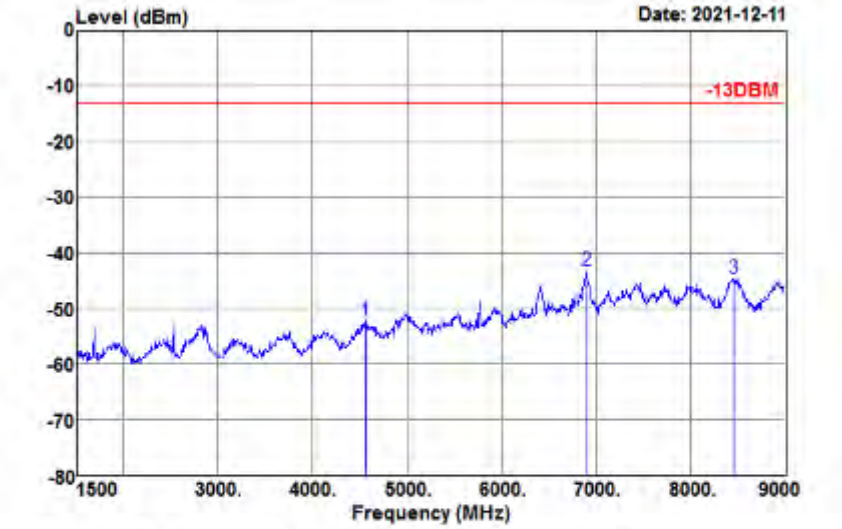
CH20635:

MODE	TX channel 20635	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2842.500	-59.44	7.66	-51.78	-13.00	-38.78	Peak
6900.000	-62.43	18.11	-44.32	-13.00	-31.32	Peak
8475.000	-64.02	19.26	-44.76	-13.00	-31.76	Peak

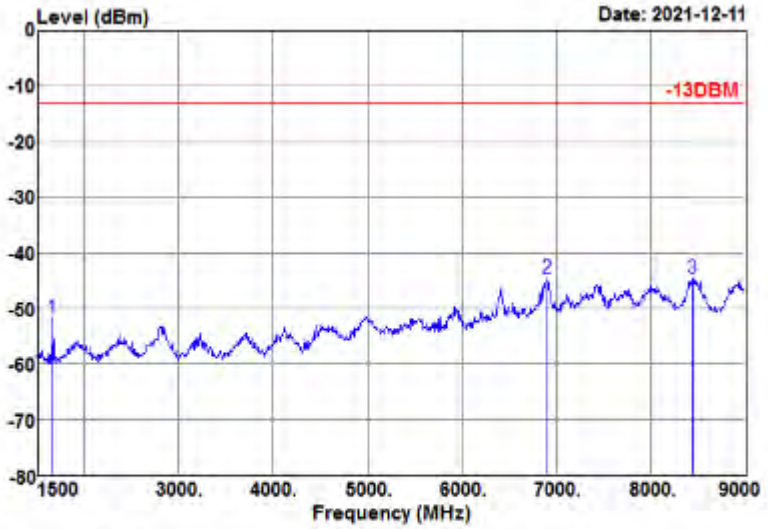
MODE	TX channel 20635	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
4560.000	-63.86	11.80	-52.06	-13.00	-39.06	Peak
6900.000	-61.67	18.53	-43.14	-13.00	-30.14	Peak
8452.500	-64.07	19.54	-44.53	-13.00	-31.53	Peak

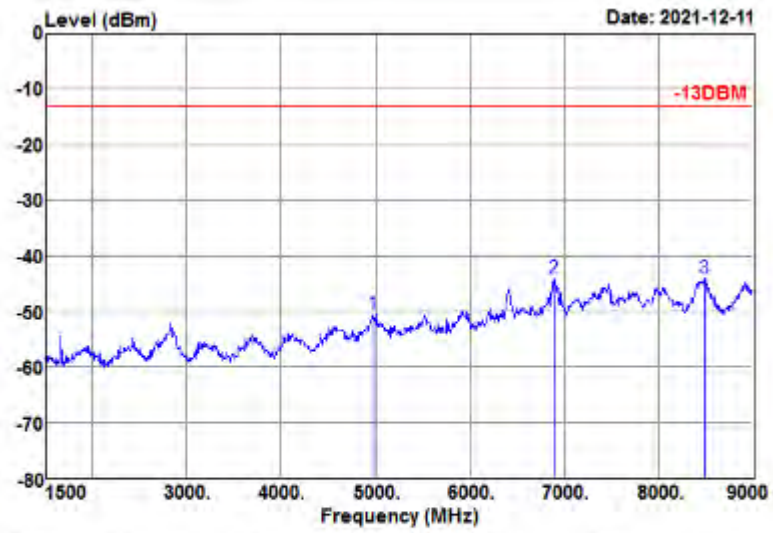
CHANNEL BANDWIDTH: 5MHz / QPSK

MODE	TX channel 20525	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
1672.500	-57.95	6.24	-51.71	-13.00	-38.71	Peak
6907.500	-62.83	18.15	-44.68	-13.00	-31.68	Peak
8445.000	-63.81	19.26	-44.55	-13.00	-31.55	Peak

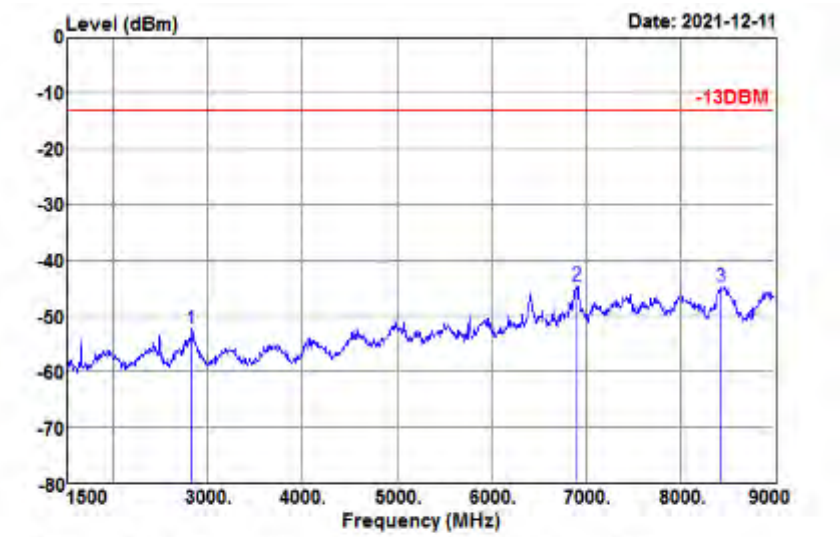
MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	AC 120V/60Hz
TESTED BY	Jace Hu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			



Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
4972.500	-63.37	12.82	-50.55	-13.00	-37.55	Peak
6892.500	-62.54	18.50	-44.04	-13.00	-31.04	Peak
8490.000	-63.61	19.54	-44.07	-13.00	-31.07	Peak

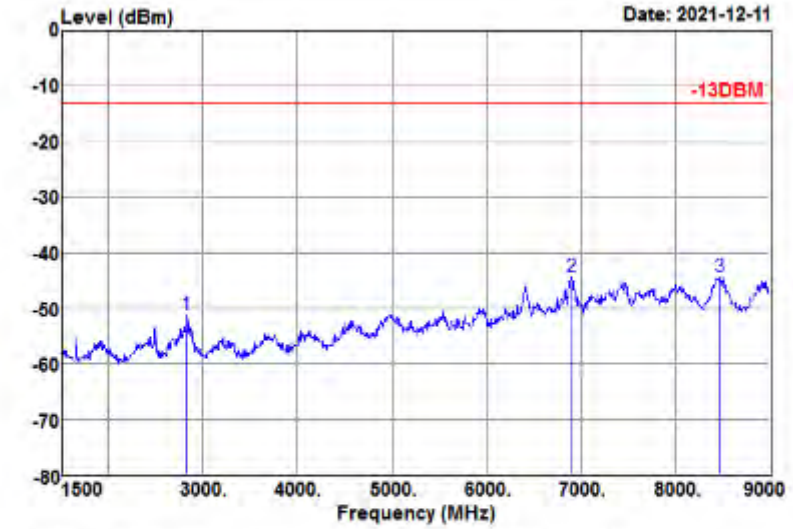
CHANNEL BANDWIDTH: 10MHz / QPSK

MODE	TX channel 20525	**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 MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-60.06	7.70	-52.36	-13.00	-39.36	Peak
6900.000	-62.67	18.11	-44.56	-13.00	-31.56	Peak
8430.000	-64.07	19.25	-44.82	-13.00	-31.82	Peak

MODE	TX channel 20525	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			



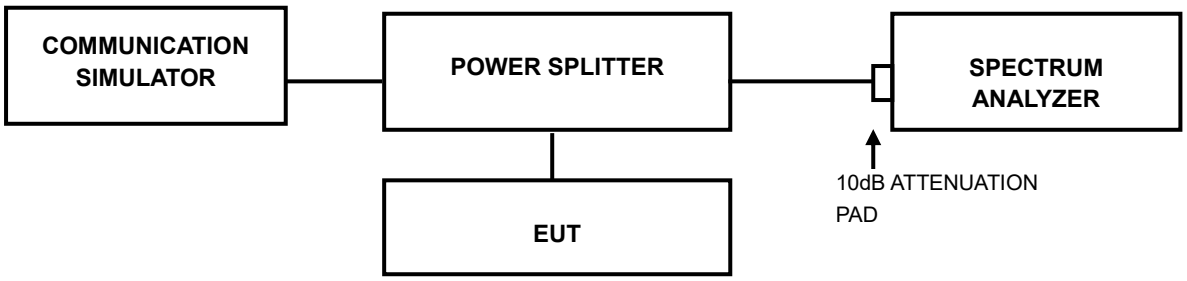
Freq MHz	Reading level dBm	Aux factor dB	level dBm	Limit level dBm	Over limit dB	Remark
2835.000	-59.23	8.03	-51.20	-13.00	-38.20	Peak
6907.500	-62.85	18.57	-44.28	-13.00	-31.28	Peak
8475.000	-63.98	19.54	-44.44	-13.00	-31.44	Peak

3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.7.4 TEST RESULTS

Please Refer to Appendix Of this test report.

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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Tel: +86-755-88696566
Fax: +86-755-88696577

Email: customerservice.sw@bureauveritas.com
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.