TEST REPORT
FCC Part 22 /Part 24/ Part 27

Report Reference No.:	HK2009012691-5E
FCC ID :	**2AJOTTA-1318**
Compiled by (position+printed name+signature)..:	File administrators Gary Qian
Supervised by (position+printed name+signature)..:	Technique principal Eden Hu
Approved by (position+printed name+signature)..:	Manager Jason Zhou
Date of issue.....:	Sept. 17, 2020

Testing Laboratory Name .....:	**Shenzhen HUAK Testing Technology Co., Ltd.**
Address.....:	1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,Heping Community, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name.....:	**HMD global Oy**
Address.....:	Bertel Jungin aukio 9, 02600 Espoo Finland
Test specification ..... :	
Standard ..... :	**FCC Part 22: PUBLIC MOBILE SERVICES** **FCC Part 24: PERSONAL COMMUNICATIONS SERVICES** **FCC Part 27: MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES**

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Test item description .....:	Mobile Phone
Trade Mark .....:	NOKIA
Manufacturer.....:	HMD global Oy
Model/Type reference.....:	TA-1318
Listed Models .....:	N/A
Ratings.....:	DC 3.8V from battery or DC 5V from adapter
Modulation .....:	QPSK
Hardware version .....:	V2.0
Software version .....:	V2.0
Frequency.....	UMTS Band II, UMTS Band V, UMTS Band IV
Result.....:	**PASS**

TEST REPORT

Test Report No. :	HK2009012691-5E	Sept. 17, 2020 Date of issue

Equipment under Test	:	Mobile Phone
Model /Type	:	TA-1318
Listed Models	:	N/A
Applicant	:	HMD global Oy
Address	:	Bertel Jungin aukio 9, 02600 Espoo Finland
Manufacturer	:	HMD global Oy
Address	:	Bertel Jungin aukio 9, 02600 Espoo Finland

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revison History

Revision	Issue Date	Revisions	Revised By
V1.0	2020-09-17	Initial Issue	Jason Zhou

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

FCC Part 22 Subpart H: PRIVATE LAND MOBILE RADIO SERVICES.

FCC Part 24 Subpart E: PUBLIC MOBILE SERVICES

FCC Part 27 : MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

ANSI/TIA-603-E-2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26-2015: IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

FCC KDB 971168D01 v03r01 Power Meas License Digital Systems

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Aug. 28, 2020
Testing commenced on	:	Aug. 29, 2020
Testing concluded on	:	Sept. 17, 2020

2.2 Product Description

The **HMD global Oy**'s Model: TA-1318 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Mobile Phone
Model Number	TA-1318
Modilation Type	QPSK for UMTS,
Antenna Type	Internal Antenna
UMTS Operation Frequency Band	Device supported UMTS FDD Band II, FDD Band V, FDD Band IV
HSDPA Release Version	Release 10
HSUPA Release Version	Release 6
DC-HSUPA Release Version	Not Supported
WCDMA Release Version	R99
Extreme temp. Tolerance	-30°C to +50°C
Extreme vol. Limits	3.33VDC to 4.07VDC (nominal: 3.8VDC)

2.3 Equipment under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.8V from battery or DC 5V from adapter

Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
WCDMA850	TX	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.6 MHz
	RX	Channel 4357	Channel 4407	Channel 4458
		871.4 MHz	881.4 MHz	891.6 MHz
Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
WCDMA1900	TX	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz
	RX	Channel 9662	Channel 9800	Channel 9938
		1932.4 MHz	1960.0 MHz	1987.6 MHz
Test Mode	TX/RX	RF Channel		
		Low(L)	Middle (M)	High (H)
WCDMA1700	TX	Channel 1312	Channel 1412	Channel 1513
		1712.4 MHz	1732.4 MHz	1752.6 MHz

2.4 Short description of the Equipment under Test (EUT)

2.4.1 General Description

This is a Mobile Phone.

For more details, refer to the user's manual of the EUT

2.5 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	/	M/N :	/
		Manufacturer:	/

2.6 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AJOTTA-1318** filing to comply with FCC Part 22 and Part 24 Rules.

2.7 General Test Conditions/Configurations

2.7.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
UMTS/TM1	WCDMA system, QPSK modulation
UMTS/TM2	HSDPA system, QPSK modulation
UMTS/TM3	HSUPA system, QPSK modulation

Note:
1. As WCDMA, HSDPA and HSUPA with the same emission designator, test result recorded in this report at the worst case UMTS/TM1 only after exploratory scan.

2.7.2 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.42V
	VN	3.8V
	VH	4.18V

NOTE: VL=lower extreme test voltage VN=nominal voltage
VH=upper extreme test voltage TN=normal temperature

2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.:1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,Heping Community, Fuhai Street, Bao' an District, Shenzhen, China

3.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

(1) expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.3 Test Description

3.3.1 Cellular Band (824-849MHz paired with 869-894MHz)

Test Item	FCC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	Part§2.1046, Part§22.913	FCC: ERP ≤ 7W. IC≤11.5W.	Pass
Bandwidth	Part§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	Part§2.1051, Part§22.917	≤-13dBm/1%*EBW, in 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	Part§2.1051, Part§22.917	FCC/IC: ≤ -13dBm/100kHz, from 9kHz to 10th harmonics but outside authorized operating frequency ranges.	Pass
Field Strength of Spurious Radiation	Part§2.1053, Part§22.917	FCC/IC: ≤ -13dBm/100kHz.	Pass
Frequency Stability	Part§2.1055, Part§22.355	FCC/IC:≤ ±2.5ppm.	Pass
NOTE 1: For the verdict, the "N/A" denotes "not applicable", the "N/T" de notes "not tested".			

3.3.2 PCS Band (1850-1915MHz paired with 1930-1995MHz)

Test Item	FCC/IC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	Part§2.1046, Part§24.232	EIRP ≤ 2W	Pass
Peak-Average Ratio	Part§2.1046, Part§24.232	FCC:Limit≤13dB	Pass
Bandwidth	Part§2.1049	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	Part§2.1051, Part§24.238	≤ -13dBm/1%*EBW, In 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	Part§2.1051, Part§24.238	≤-13dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges.	Pass
Field Strength of Spurious Radiation	Part§2.1053, Part§24.238	≤ -13dBm/1MHz.	Pass
Frequency Stability	Part§2.1055, Part§24.235	FCC: within authorized frequency block.	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

3.3.3 PCS Band (1712.4-1752.6MHz paired)

Test Item	FCC/IC Rule No.	Requirements	Verdict
Effective(Isotropic) Radiated Output Power	Part 2.1046 Part 27.50(d)(4)	EIRP ≤ 2W	Pass
Peak-Average Ratio	Part 27.50(d)(4)	FCC:Limit≤13dB	Pass
Bandwidth	Part 2.1049 Part 27.53(h)	OBW: No limit. EBW: No limit.	Pass
Band Edges Compliance	Part 2.1051 Part 27.53(h)	≤ -13dBm/1%*EBW, In 1MHz bands immediately outside and adjacent to The frequency block.	Pass
Spurious Emission at Antenna Terminals	Part 2.1051 Part 27.53(h)	≤-13dBm/1MHz, from 9kHz to10th harmonics but outside authorized Operating frequency ranges.	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53(h)	≤ -13dBm/1MHz.	Pass
Frequency Stability	Part 2.1055 Part 27.54	FCC: within authorized frequency block.	Pass
NOTE 1: For the verdict, the “N/A” denotes “not applicable”, the “N/T” de notes “not tested”.			

3.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	HKE-059	2019/12/26	2020/12/25
LISN	R&S	ENV216	HKE-002	2019/12/26	2020/12/25
Receiver	R&S	ESCI 7	HKE-010	2019/12/26	2020/12/25
Spectrum analyzer	R&S	FSP40	HKE-025	2019/12/26	2020/12/25
Spectrum analyzer	Agilent	N9020A	HKE-048	2019/12/26	2020/12/25
RF automatic control unit	Tonscend	JS0806-1	HKE-060	2019/12/26	2020/12/25
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	2019/12/26	2020/12/25
Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	2019/12/26	2020/12/25
Horn antenna	Schwarzbeck	9120D	HKE-013	2019/12/26	2020/12/25
High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	2019/12/26	2020/12/25
Preamplifier	EMCI	EMC051845SE	HKE-015	2019/12/26	2020/12/25
Preamplifier	Agilent	83051A	HKE-016	2019/12/26	2020/12/25
Preamplifier	Schwarzbeck	BBV 9743	HKE-006	2019/12/26	2020/12/25
Temperature and humidity meter	Boyang	HTC-1	HKE-075	2019/12/26	2020/12/25
High-low temperature chamber	Guangke	HT-80L	HKE-118	2019/12/26	2020/12/25
High pass filter unit	Tonscend	JS0806-F	HKE-055	2019/12/26	2020/12/25
RF Cable(below1GHz)	Times	9kHz-1GHz	HKE-117	2019/12/26	2020/12/25
RF Cable(above 1GHz)	Times	1-40G	HKE-034	2019/12/26	2020/12/25
Power meter	Agilent	E4419B	HKE-085	2019/12/26	2020/12/25
Power Sensor	Agilent	E9300A	HKE-086	2019/12/26	2020/12/25
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A
Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A	N/A
RF test software	Tonscend	JS1120-B Version 2.6	HKE-083	N/A	N/A
RF test software	Tonscend	JS1120-4	HKE-113	N/A	N/A
RF test software	Tonscend	JS1120-3	HKE-114	N/A	N/A
RF test software	Tonscend	JS1120-1	HKE-115	N/A	N/A
Wireless Communication Test Set	R&S	CMW500	HKE-026	2019/12/26	2020/12/25
Wireless Communication Test Set	R&S	CMU200	HKE-029	2019/12/26	2020/12/25

Note: 1. The Cal.Interval was one year.

4 TEST CONDITIONS AND RESULTS

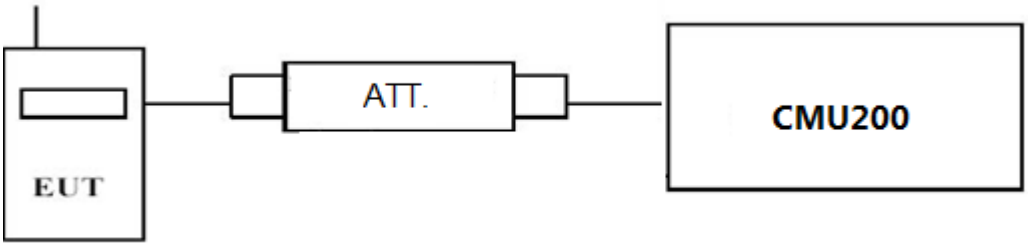
4.1 Output Power

TEST APPLICABLE

During the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMU200) to ensure max power transmission and proper modulation. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

4.1.1 Conducted Output Power

TEST CONFIGURATION



TEST PROCEDURE

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a CMU200 by an Att.
c) EUT Communicate with CMU200 then selects a channel for testing.
d) Add a correction factor to the display CMU200, and then test.

TEST RESULTS

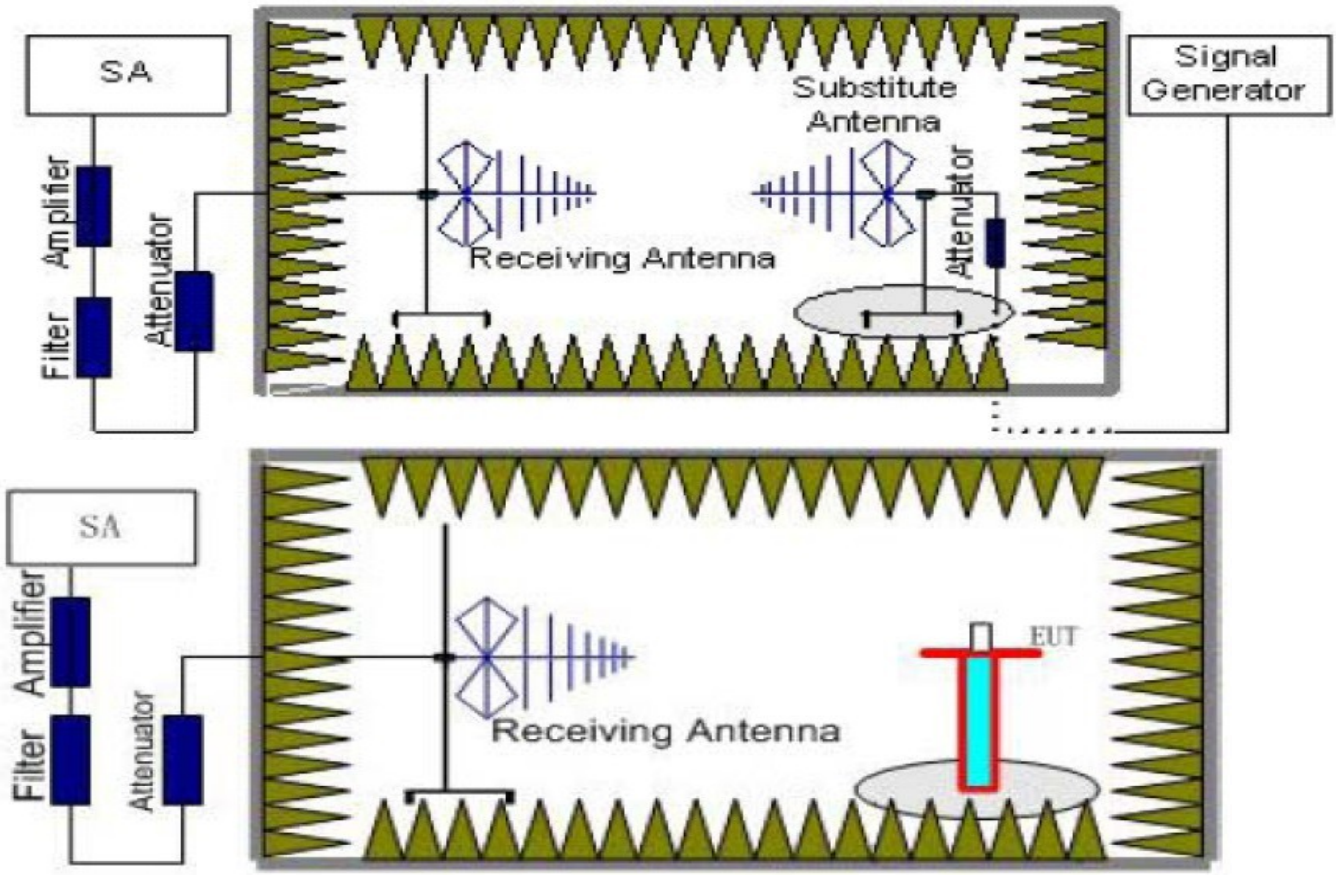
Test Mode	Test Channel	Burst Average Conducted power (dBm)		
		UMTS Band V	UMTS Band II	UMTS Band IV
UMTS/TM1	LCH	21.96	23.28	24.84
	MCH	22.36	23.24	24.94
	HCH	21.80	23.02	24.97
UMTS/TM2	LCH_SubTest-1	22.23	22.23	22.11
	LCH_SubTest-2	20.87	20.86	21.30
	LCH_SubTest-3	22.17	22.13	21.16
	LCH_SubTest-4	21.55	21.45	21.36
	MCH_SubTest-1	21.37	21.31	22.09
	MCH_SubTest-2	21.26	21.41	21.61
	MCH_SubTest-3	22.13	22.00	22.41
	MCH_SubTest-4	21.67	21.56	21.49
	HCH_SubTest-1	22.38	22.32	20.79
	HCH_SubTest-2	21.52	21.27	19.71
	HCH_SubTest-3	19.75	20.78	20.65
	HCH_SubTest-4	19.76	19.90	19.13
UMTS/TM3	LCH_SubTest-1	20.46	20.49	20.59
	LCH_SubTest-2	19.28	19.35	21.43
	LCH_SubTest-3	19.50	19.44	20.15
	LCH_SubTest-4	21.42	21.17	21.16
	LCH_SubTest-5	20.19	20.25	20.09
	MCH_SubTest-1	21.09	21.10	21.70
	MCH_SubTest-2	20.19	20.03	20.37
	MCH_SubTest-3	21.69	21.62	19.97
	MCH_SubTest-4	20.28	20.40	19.60
	MCH_SubTest-5	19.95	20.10	20.00
	HCH_SubTest-1	19.51	19.57	20.50
	HCH_SubTest-2	19.95	20.13	20.32
	HCH_SubTest-3	20.45	20.66	20.67
	HCH_SubTest-4	20.36	20.49	20.77
	HCH_SubTest-5	20.64	20.69	20.93

4.1.2 Radiated Output Power

TEST DESCRIPTION

This is the test for the maximum radiated power from the EUT.
"Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

TEST CONFIGURATION



TEST PROCEDURE

1. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=10MHz,VBW=10MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver

reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
   We used SMF100A micowave signal generator which signal level can up to 33dBm,so we not used power Amplifier for substituation test; The measurement results are amend as described below:
   Power(EIRP)=P_{Mea}- P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST LIMIT

According to 22.913(a), 24.232(c) the ERP(EIRP) should be not exceeding following table limits:

	Burst Average ERP
UMTS Band V	38.45dBm (7W)

	Burst Average ERP
UMTS Band IV	30dBm (1W)

	Burst Average ERP
UMTS Band II	33dBm (2W)

TEST RESULTS

Remark:
1. We were tested all Configuration refer 3GPP TS134 121.
2. EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)
3. ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.
4. Note: We test the H direction and V direction, V direction is worse.

UMTS/TM1/UMTS Band II

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain (dB)	P_{Ag} (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.4	-21.44	3.41	10.24	33.60	18.99	33.01	14.02	V
1880.0	-18.83	3.49	10.24	33.60	21.52	33.01	11.49	V
1907.6	-20	3.55	10.23	33.60	20.28	33.01	12.73	V

UMTS/TM1/UMTS Band V

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.40	-13.34	2.42	8.45	2.15	36.82	27.36	38.45	11.09	V
836.40	-15.16	2.46	8.45	2.15	36.82	25.5	38.45	12.95	V
846.60	-11.7	2.53	8.36	2.15	36.82	28.8	38.45	9.65	V

UMTS/TM1/UMTS Band IV

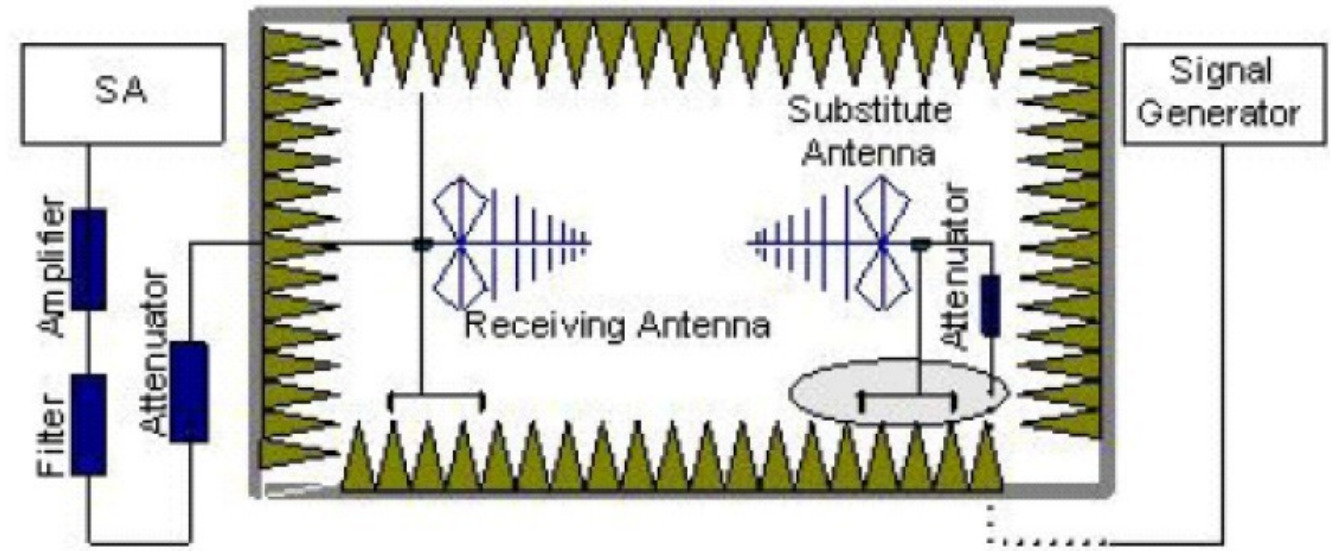
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.4	-13.17	2.42	8.45	2.15	36.82	27.53	38.45	10.92	V
1732.6	-15.75	2.46	8.45	2.15	36.82	24.91	38.45	13.54	V
1752.6	-11.49	2.53	8.36	2.15	36.82	29.01	38.45	9.44	V

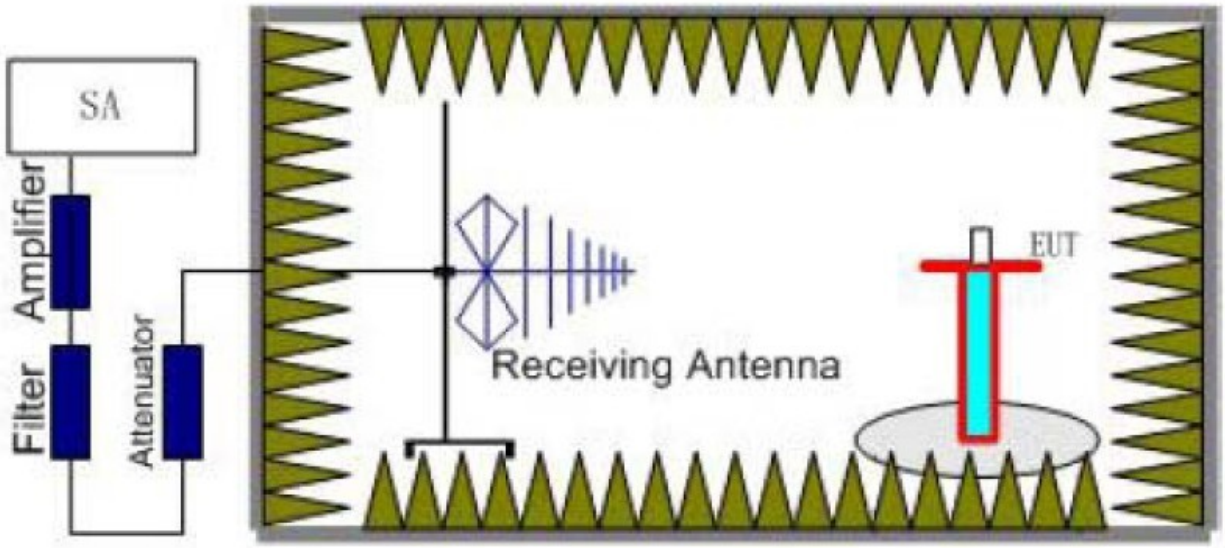
4.2 Radiated Spurious Emssion

TEST APPLICABLE

According to the TIA/EIA 603D:2010 test method, The Receiver or Spectrum was scanned from 9 KHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz The resolution bandwidth is set as outlined in TIA/EIA 603D:2010. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band II , WCDMA Band V., WCDMA Band IV

TEST CONFIGURATION





TEST PROCEDURE

1. EUT was placed on a 1.50 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.50m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
8. In order to make sure test results more clearly,we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
UMTS/TM1/ WCDMA Band V	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
UMTS/TM1/ WCDMA Band IV	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
UMTS/TM1/ WCDMA Band II	0.00009~0.15	1KHz	3KHz	30
	0.00015~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1~2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

TEST LIMITS

that 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 specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Frequency	Channel	Frequency Range	Verdict
UMTS/TM1/ WCDMA Band V	Low	9KHz-10GHz	PASS
	Middle	9KHz -10GHz	PASS
	High	9KHz -10GHz	PASS
UMTS/TM1/ WCDMA Band II	Low	9KHz -20GHz	PASS
	Middle	9KHz -20GHz	PASS
	High	9KHz -20GHz	PASS
UMTS/TM1/ WCDMA Band IV	Low	9KHz-10GHz	PASS
	Middle	9KHz -10GHz	PASS
	High	9KHz -10GHz	PASS

TEST RESULTS

Remark:
1. We were tested all Configuration refer 3GPP TS134 121.
2. EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)
3. ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.
5. Margin = Limit – Emission Level
6. We test both H direction and V direction, recorded worst case direction.

UMTS/TM1/ WCDMA Band II _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3704.8	-43.93	4.39	3.00	12.34	-35.98	-13.00	22.98	H
5557.2	-49.51	5.31	3.00	13.52	-41.3	-13.00	28.30	H
3704.8	-50.89	4.39	3.00	12.34	-42.94	-13.00	29.94	V
5557.2	-53.54	5.31	3.00	13.52	-45.33	-13.00	32.33	V

UMTS/TM1/ WCDMA Band II _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.0	-41.1	4.41	3.00	12.34	-33.17	-13.00	20.17	H
5640.0	-48.66	5.38	3.00	13.58	-40.46	-13.00	27.46	H
3760.0	-43.24	4.41	3.00	12.34	-35.31	-13.00	22.31	V
5640.0	-44.78	5.38	3.00	13.58	-36.58	-13.00	23.58	V

UMTS/TM1/ WCDMA Band II _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3815.2	-43.11	4.45	3.00	12.45	-35.11	-13.00	22.11	H
5722.8	-48.47	5.47	3.00	13.66	-40.28	-13.00	27.28	H
3815.2	-46.36	4.45	3.00	12.45	-38.36	-13.00	25.36	V
5722.8	-49.12	5.48	3.00	13.66	-40.94	-13.00	27.94	V

UMTS/TM1/ WCDMA Band V _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1652.8	-29.47	3.00	3.00	9.58	-22.89	-13.00	9.89	H
2479.2	-36.49	3.03	3.00	10.72	-28.8	-13.00	15.8	H
1652.8	-30.57	3.00	3.00	9.68	-23.89	-13.00	10.89	V
2479.2	-39.35	3.03	3.00	10.72	-31.66	-13.00	18.66	V

UMTS/TM1/ WCDMA Band V _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1672.8	-28.25	3.00	3.00	9.58	-21.67	-13.00	8.67	H
2509.2	-39.2	3.03	3.00	10.72	-31.51	-13.00	18.51	H
1672.8	-30.94	3.00	3.00	9.68	-24.26	-13.00	11.26	V
2509.2	-38.44	3.03	3.00	10.72	-30.75	-13.00	17.75	V

UMTS/TM1/ WCDMA Band V _ High Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1693.2	-32.76	3.00	3.00	9.58	-26.18	-13.00	13.18	H
2539.8	-38.2	3.03	3.00	10.72	-30.51	-13.00	17.51	H
1693.2	-30.61	3.00	3.00	9.68	-23.93	-13.00	10.93	V
2539.8	-35.53	3.03	3.00	10.72	-27.84	-13.00	14.84	V

UMTS/TM1/ WCDMA Band IV _ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.4	-31.44	3.00	3.00	9.58	-24.86	-13.00	11.86	H
2568.6	-32.08	3.03	3.00	10.72	-24.39	-13.00	11.39	H
1712.4	-33.57	3.00	3.00	9.68	-26.89	-13.00	13.89	V
2568.6	-33.65	3.03	3.00	10.72	-25.96	-13.00	12.96	V

UMTS/TM1/ WCDMA Band IV _ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1732.6	-29.93	3.00	3.00	9.58	-23.35	-13.00	10.35	H
2598.9	-32.86	3.03	3.00	10.72	-25.17	-13.00	12.17	H
1732.6	-34.3	3.00	3.00	9.68	-27.62	-13.00	14.62	V
2598.9	-31.93	3.03	3.00	10.72	-24.24	-13.00	11.24	V

UMTS/TM1/ WCDMA Band IV _ High Channel

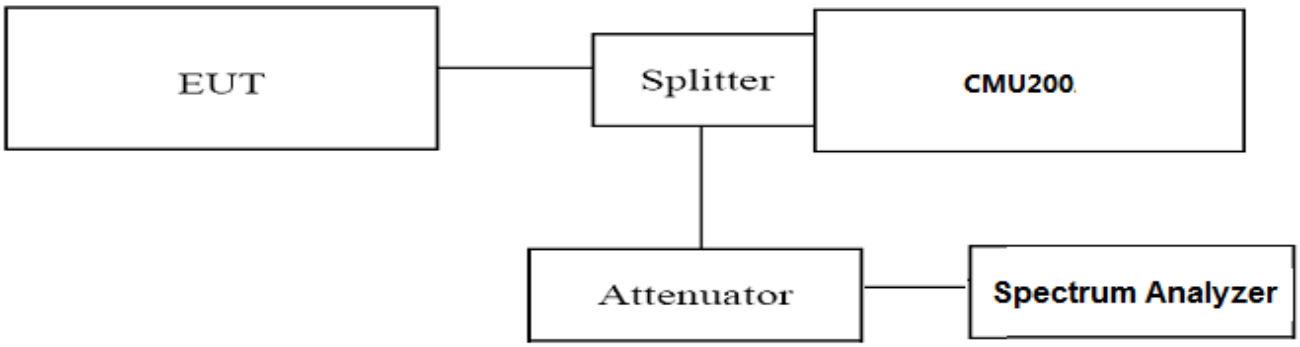
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1752.6	-32.7	3.00	3.00	9.58	-26.12	-13.00	13.12	H
2628.9	-38.49	3.03	3.00	10.72	-30.8	-13.00	17.8	H
1752.6	-30.94	3.00	3.00	9.68	-24.26	-13.00	11.26	V
2628.9	-35.13	3.03	3.00	10.72	-27.44	-13.00	14.44	V

4.3 Occupied Bandwidth and Emission Bandwith

TEST APPLICABLE

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA Band II , WCDMA band V, WCDMA band IV. The table below lists the measured 99% Bandwidth and -26dBc Bandwidth.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. Set RBW=100KHz,VBW=300KHz,Span=10MHz, SWT=Auto;
3. Set SPA Max hold and View, Set 99% Occupied Bandwidth/ Set -26dBc Occupied Bandwidth
4. These measurements were done at 3 frequencies for WCDMA band II /V. (low, middle and high of operational frequency range).

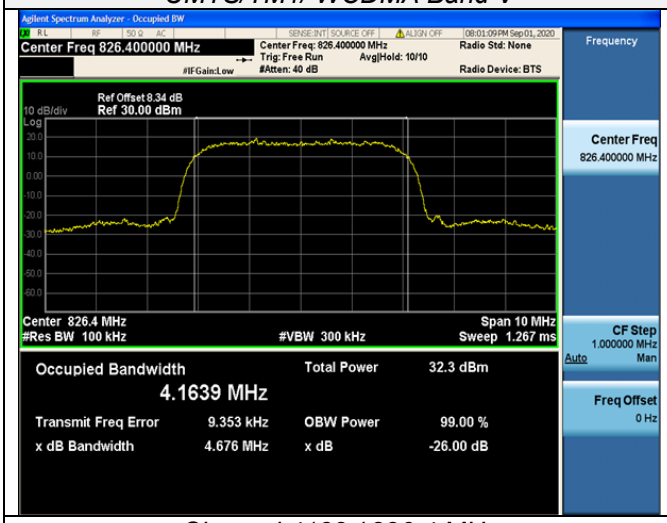
TEST RESULTS

Test Mode	Channel	Frequency (MHz)	Occupied Bandwidth (99% BW) (MHz)	Emission Bandwidth (-26 dBc BW) (MHz)	Verdict
UMTS/TM1/ WCDMA Band V	4132	826.40	4.1639	4.676	PASS
	4183	836.40	4.1481	4.682	PASS
	4233	846.60	4.1583	4.669	PASS
UMTS/TM1/ WCDMA Band II	9262	1852.4	4.1587	4.684	PASS
	9400	1880.0	4.1482	4.696	PASS
	9538	1907.6	4.1658	4.708	PASS
UMTS/TM1/ WCDMA Band IV	1312	1712.4	4.1472	4.682	PASS
	1413	1732.6	4.1555	4.682	PASS
	1513	1752.6	4.1541	4.688	PASS

Remark:
1. Test results including cable loss;
2. please refer to following plots;

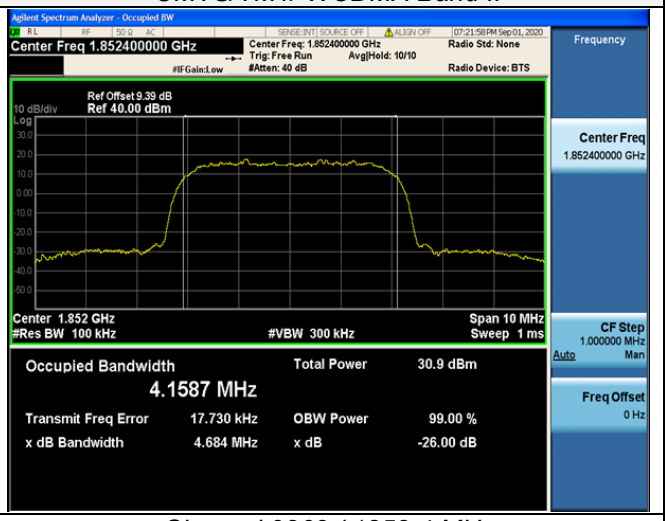
Occupied Bandwidth and Emission Bandwidth

UMTS/TM1/ WCDMA Band V

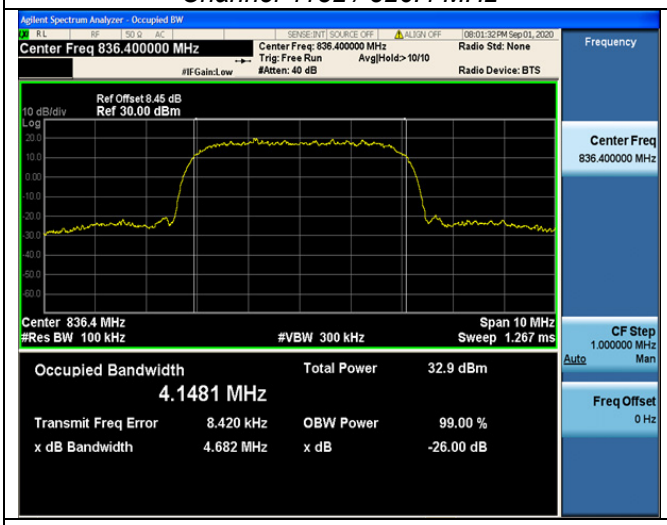


Channel 4132 / 826.4 MHz

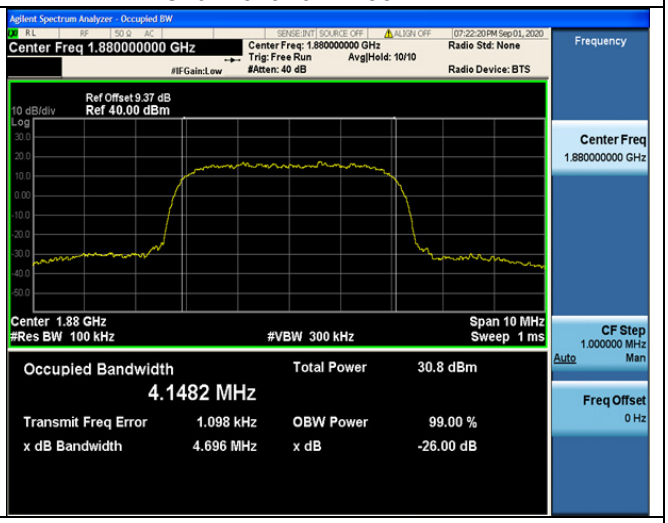
UMTS/TM1/ WCDMA Band II



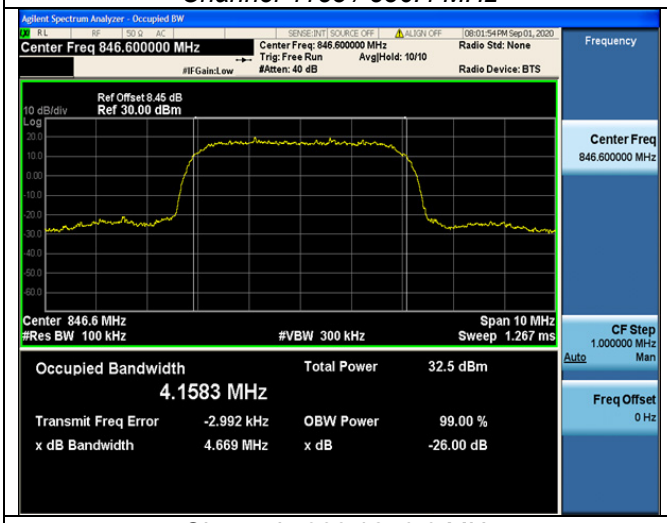
Channel 9262 / 1852.4 MHz



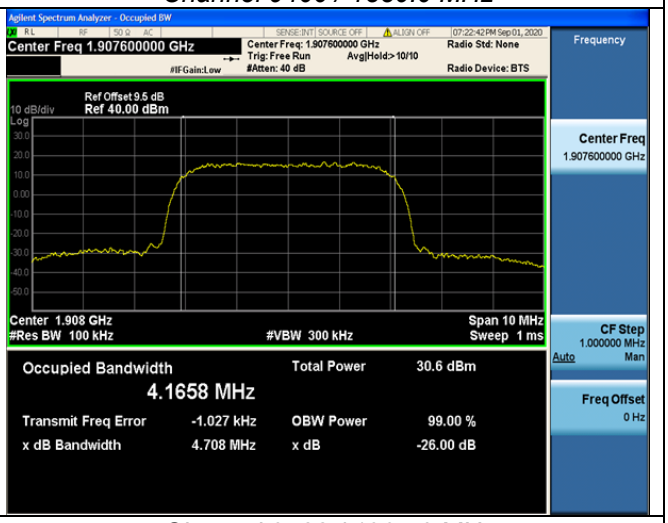
Channel 4183 / 836.4 MHz



Channel 9400 / 1880.0 MHz



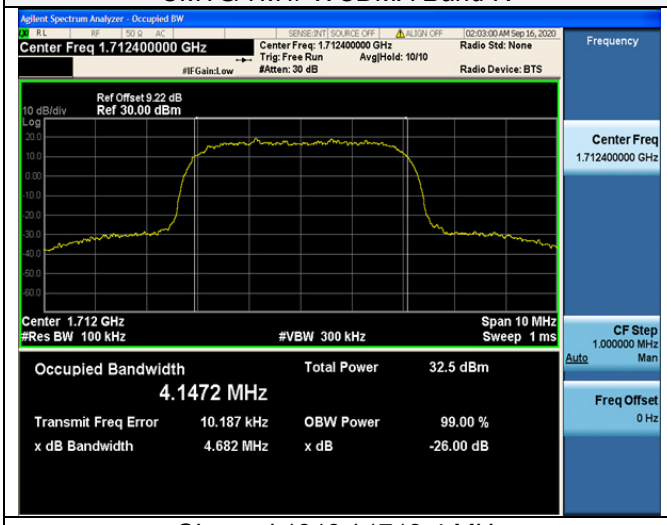
Channel 4233 / 846.6 MHz



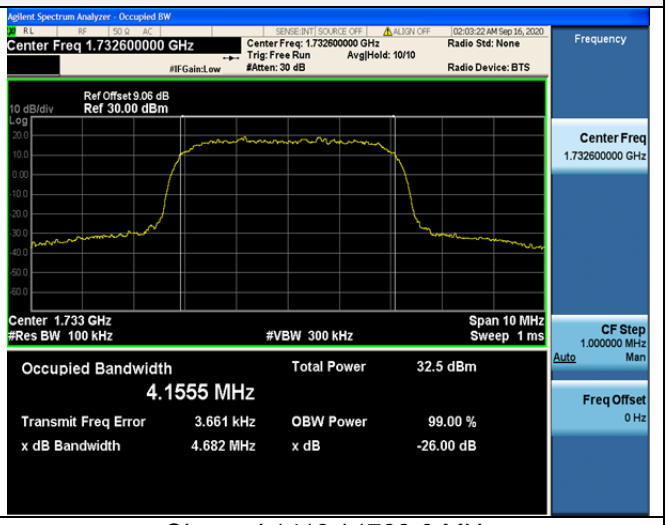
Channel 9538 / 1907.6 MHz

Occupied Bandwidth and Emission Bandwidth

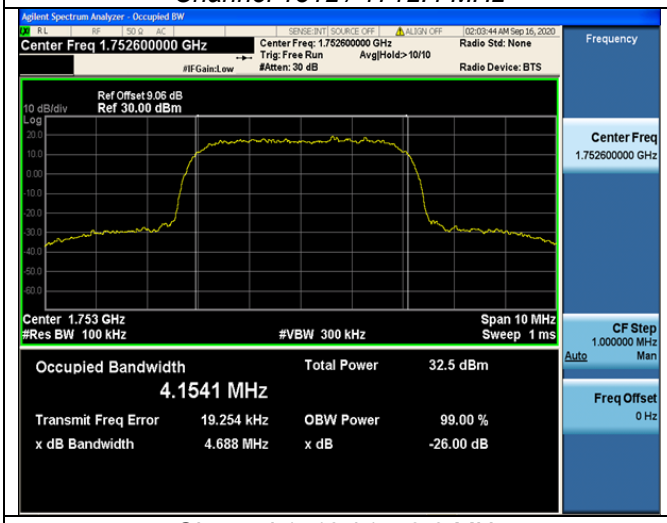
UMTS/TM1/ WCDMA Band IV



Channel 1312 / 1712.4 MHz



Channel 1413 / 1732.6 MHz



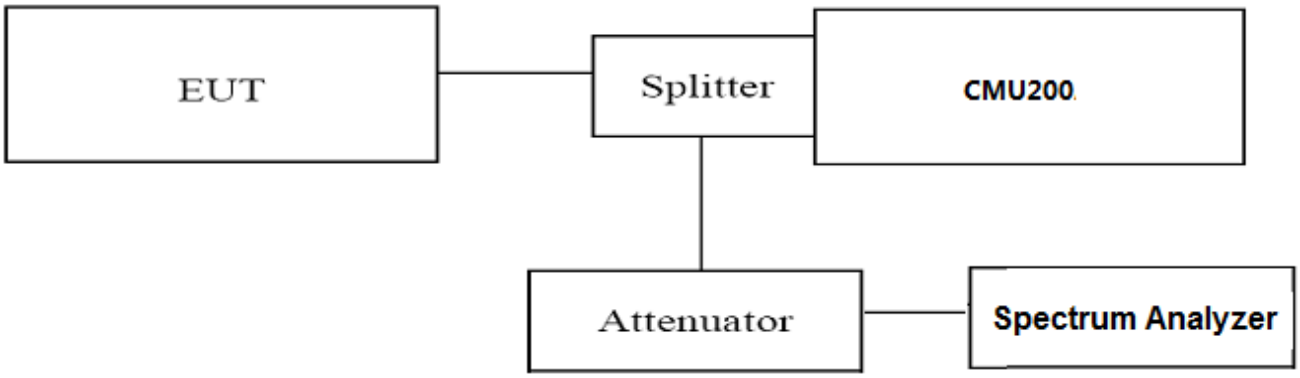
Channel 1513 / 1752.6 MHz

4.4 Band Edge Compliance

TEST APPLICABLE

During the process of testing, the EUT was controlled via Aglient Digital Radio Communication tester (CMU200) to ensure max power transmission and proper modulation.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was set up for the max output power with pseudo random data modulation;
2. Set RBW=51KHz,VBW=200KHz,Span=2MHz ,Dector: RMS;
3. These measurements were done at 2 frequencies (low and high of operational frequency range).

TEST RESULTS

UMTS/TM1/WCDMA Band V					
Test Mode	**Channel**	**Frequency (MHz)**	**Band Edg Compliance (dBm)**	**Limits (dBm)**	**Verdict**
UMTS/TM1/WCDMA Band V	4132	826.4	<-13dBm	-13dBm	PASS
	4233	846.6	<-13dBm	-13dBm	
UMTS/TM1/WCDMA Band II					
Test Mode	**Channel**	**Frequency (MHz)**	**Band Edg Compliance (dBm)**	**Limits (dBm)**	**Verdict**
UMTS/TM1/WCDMA Band II	9262	1852.4	<-13dBm	-13dBm	PASS
	9538	1907.6	<-13dBm	-13dBm	
UMTS/TM1/WCDMA Band IV					
Test Mode	**Channel**	**Frequency (MHz)**	**Band Edg Compliance (dBm)**	**Limits (dBm)**	**Verdict**
UMTS/TM1/WCDMA Band IV	1312	1712.4	<-13dBm	-13dBm	PASS
	1513	1752.6	<-13dBm	-13dBm	

Remark:
1. Test results including cable loss;
2. please refer to following plots;

Band-edge Compliance	
UMTS/TM1/WCDMA Band V	*UMTS/TM1/WCDMA Band II*
Channel 4132 / 826.4 MHz	*Channel 9262 / 1852.4 MHz*
Channel 4233 / 846.6 MHz	*Channel 9538 / 1907.6 MHz*

UMTS/TM1/WCDMA Band IV	
Channel 1312 / 1712.4 MHz	hannel 1512 / 1752.6 MHz