FCC Radio Test Report

FCC ID: 2AYW8WL21C01

This report concerns: Original Grant

Project No.	:	2101C159
Equipment	:	LTE Wireless Router
Brand Name	:	WiLINQ
Test Model	:	D010U
Series Model	:	N/A
Applicant	:	Acentury Inc.
Address	:	120 West Beaver Creek Road, Unit 13, Richmond Hill, ON Canada, L4B 1L2
Manufacturer	:	Acentury Inc.
Address	:	120 West Beaver Creek Road, Unit 13, Richmond Hill, ON Canada, L4B 1L2
Factory	:	Acentury Inc.
Address	:	120 West Beaver Creek Road, Unit 13, Richmond Hill, ON Canada, L4B 1L2
Date of Receipt	:	Jan. 19, 2021
Date of Test	:	Jan. 19, 2021 ~ Feb. 23, 2021
Issued Date	:	Mar. 12, 2021
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG2021011916 for conducted, DG2021011917 for radiated.
Standard(s)	:	47 CFR FCC Part 24 Subpart E 47 CFR FCC Part 2 ANSI/TIA/EIA-603-E-2016 FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Vegeta Li

Prepared by : Vegeta Li

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

Table of Contents Page

REPORT ISSUED HISTORY 5

1 . SUMMARY OF TEST RESULTS 6

1.1 TEST FACILITY 7

1.2 MEASUREMENT UNCERTAINTY 7

1.3 TEST ENVIRONMENT CONDITIONS 7

2 . GENERAL INFORMATION 8

2.1 GENERAL DESCRIPTION OF EUT 8

2.2 DESCRIPTION OF TEST MODES 11

2.3 BLOCKDIGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED 14

2.4 DESCRIPTION OF SUPPORT UNITS 14

3 . TEST RESULT 15

3.1 OUTPUT POWER MEASUREMENT 15

3.1.1 LIMIT 15

3.1.2 TEST PROCEDURE 15

3.1.3 TEST SETUP LAYOUT 15

3.1.4 TEST DEVIATION 15

3.1.5 TEST RESULTS 15

3.2 OCCUPIED BANDWIDTH MEASUREMENT 16

3.2.1 TEST PROCEDURE 16

3.2.2 TEST SETUP LAYOUT 16

3.2.3 TEST DEVIATION 16

3.2.4 TEST RESULTS 16

3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT 17

3.3.1 LIMIT 17

3.3.2 TEST PROCEDURES 17

3.3.3 TEST SETUP LAYOUT 17

3.3.4 TEST DEVIATION 17

3.3.5 TEST RESULTS 17

3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT 18

3.4.1 LIMIT 18

3.4.2 TEST PROCEDURES 18

3.4.3 TEST SETUP LAYOUT 19

3.4.4 TEST DEVIATION 20

3.4.5 TEST RESULTS (9KHZ TO 30MHZ) 20

3.4.6 TEST RESULTS (30MHZ TO 1000MHZ) 20

3.4.7 TEST RESULTS (ABOVE 1000MHZ) 20

3.5 BAND EDGE MEASUREMENT 21

3.5.1 LIMIT 21

3.5.2 TEST PROCEDURES 21

Table of Contents Page

3.5.3 TEST SETUP LAYOUT 21
3.5.4 TEST DEVIATION 21
3.5.5 TEST RESULTS 21
3.6 PEAK TO AVERAGE RATIO MEASUREMENT 22
3.6.1 LIMIT 22
3.6.2 TEST PROCEDURES 22
3.6.3 TEST SETUP LAYOUT 22
3.6.4 TEST DEVIATION 22
3.6.5 TEST RESULTS 22
3.7 FREQUENCY STABILITY MEASUREMENT 23
3.7.1 LIMIT 23
3.7.2 TEST PROCEDURES 23
3.7.3 TEST SETUP LAYOUT 23
3.7.4 TEST DEVIATION 23
3.7.5 TEST RESULTS 23
4. LIST OF MEASUREMENT EQUIPMENTS 24
5. EUT TEST PHOTO 26
APPENDIX A - OUTPUT POWER 29
APPENDIX B - OCCUPIED BANDWIDTH 44
APPENDIX C - CONDUCTED SPURIOUS EMISSIONS 86
APPENDIX D - RADIATED SPURIOUS EMISSIONS (9KHZ TO 30MHZ) 95
APPENDIX E - RADIATED SPURIOUS EMISSIONS (30MHZ TO 1000MHZ) 100
APPENDIX C - RADIATED SPURIOUS EMISSIONS (ABOVE 1000MHZ) 117
APPENDIX G - BAND EDGE 134
APPENDIX H - PEAK TO AVERAGE RATIO 149
APPENDIX I - FREQUENCY STABILITY 176

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Mar. 12, 2021

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 24 Subpart E & Part 2			
Standard(s) Section	**Test Item**	**Judgment**	**Remark**
2.1046 24.232(c)	Equivalent Isotropic Radiated Power	PASS	------
2.1049	Occupied Bandwidth	PASS	------
2.1051 24.238(a)	Conducted Spurious Emissions	PASS	------
2.1053 24.238(a)	Radiated Spurious Emissions	PASS	------
24.238(a)	Band Edge Measurements	PASS	------
24.232(d)	Peak To Average Ratio	PASS	------
2.1055 24.235	Frequency Stability	PASS	------

Note:

(1) “N/A” denotes test is not applicable in this test report.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.
BTL's Test Firm Registration Number for FCC: 357015
BTL's Designation Number for FCC: CN1240

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))
The BTL measurement uncertainty as below table:

A. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 6GHz	4.58
		6GHz ~ 18GHz	5.18

B. Other Measurement:

Parameter	Uncertainty
Spectrum Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Power Spectral Density	±0.86 dB
Frequency Stability	±0.16 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Output Power & ERP	22°C	47%	AC 120V/60Hz	Tate Liu
Occupied Bandwidth	22°C	47%	AC 120V/60Hz	Tate Liu
Conducted Spurious Emissions	22°C	47%	AC 120V/60Hz	Tate Liu
Radiated Spurious Emissions	26°C	52%	AC 120V/60Hz	Grani Zhou
Band Edge	22°C	47%	AC 120V/60Hz	Tate Liu
Peak to Average Ratio	22°C	47%	AC 120V/60Hz	Tate Liu
Frequency Stability	Normal & Extreme	47%	Normal & Extreme	Tate Liu

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	LTE Wireless Router				
Brand Name	WiLINQ				
Test Model	D010U				
Series Model	N/A				
Model Difference(s)	N/A				
Hardware Version	TZ7.821.181				
Software Version	V1.0				
Power Source	1# DC Voltage supplied from AC adapter. Model: DCT24W120200US-A0 2# Supplied from battery. Model: Z2000				
Power Rating	1# I/P: 100-240V~ 50/60Hz 0.7A max O/P: 12V ⎓ 2.0A 2# 7.4V/ 2000mAh 14.8Wh				
IEMI No.	Radiated	866545040010941			
	Conducted	866545040010842			
Modulation Type	GSM		GMSK		
	EDGE/GPRS		GMSK, 8PSK		
	WCDMA/HSDPA/HSUPA		UL: QPSK DL: QPSK, 16QAM		
	LTE		UL: QPSK,16QAM,64QAM DL: QPSK,16QAM,64QAM		
Max. EIRP	GSM 1900 / GPRS 1900		GMSK	32.67	dBm
	EDGE 1900		8PSK	32.65	dBm
	WCDMA Band II		QPSK	25.59	dBm
	HSDPA Band II		QPSK	24.20	dBm
	HSUPA Band II		QPSK	24.09	dBm
	LTE	Channel Bandwidth (MHz)	QPSK (dBm)	16QAM (dBm)	64QAM (dBm)
	Band 2	1.4	25.07	24.24	23.34
		3	25.12	24.30	23.08
		5	25.11	24.40	23.26
		10	25.32	24.29	23.40
		15	25.58	24.68	23.87
		20	25.65	25.33	24.43
	Band 25	1.4	25.02	24.33	23.48
		3	25.12	24.41	23.32
		5	25.32	24.65	23.52
		10	25.25	24.54	23.33
		15	25.66	24.96	23.83
		20	25.74	25.13	24.32

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

PCS 1900				
Test Frequency ID	UARFCN	Frequency of Uplink (MHz)	UARFCN	Frequency of Downlink (MHz)
Low Range	512	1850.2	528	1930.2
Mid Range	661	1880	677	1960
High Range	810	1909.8	826	1989.8

WCDMA Band II				
Test Frequency ID	UARFCN	Frequency of Uplink (MHz)	UARFCN	Frequency of Downlink (MHz)
Low Range	9262	1852.4	9662	1932.4
Mid Range	9400	1880.0	9800	1960.0
High Range	9538	1907.6	9938	1987.6

LTE Band 2					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	18607	1850.7	607	1930.7
	3	18615	1851.5	615	1931.5
	5	18625	1852.5	625	1932.5
	10	18650	1855	650	1935
	15	18675	1857.5	675	1937.5
	20	18700	1860	700	1940
Mid Range	1.4/3/5/10/15/20	18900	1880	900	1960
High Range	1.4	19193	1909.3	1193	1989.3
	3	19185	1908.5	1185	1988.5
	5	19175	1907.5	1175	1987.5
	10	19150	1905	1150	1985
	15	19125	1902.5	1125	1982.5
	20	19100	1900	1100	1980

LTE Band 25					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	26047	1850.7	8047	1930.7
	3	26055	1851.5	8055	1931.5
	5	26065	1852.5	8065	1932.5
	10	26090	1855	8090	1935
	15	26115	1857.5	8115	1937.5
	20	26140	1860	8140	1940
Mid Range	1.4/3/5/10/15/20	26365	1882.5	8365	1962.5
High Range	1.4	26683	1914.3	8683	1994.3
	3	26675	1913.5	8675	1993.5
	5	26665	1912.5	8665	1992.5
	10	26640	1910	8640	1990
	15	26615	1907.5	8615	1987.5
	20	26590	1905	8590	1985

3. Table for Filed Antenna:

Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
N/A	N/A	FPC	N/A	3	PCS 1900
N/A	N/A	FPC	N/A	3	WCDMA Band II
N/A	N/A	FPC	N/A	3	LTE Band 2
N/A	N/A	FPC	N/A	3	LTE Band 25

Note: The antenna gain is provided by the manufacturer.

2.2 DESCRIPTION OF TEST MODES

Following mode(s) is (were) found to be the worst case(s) and selected for the final test.

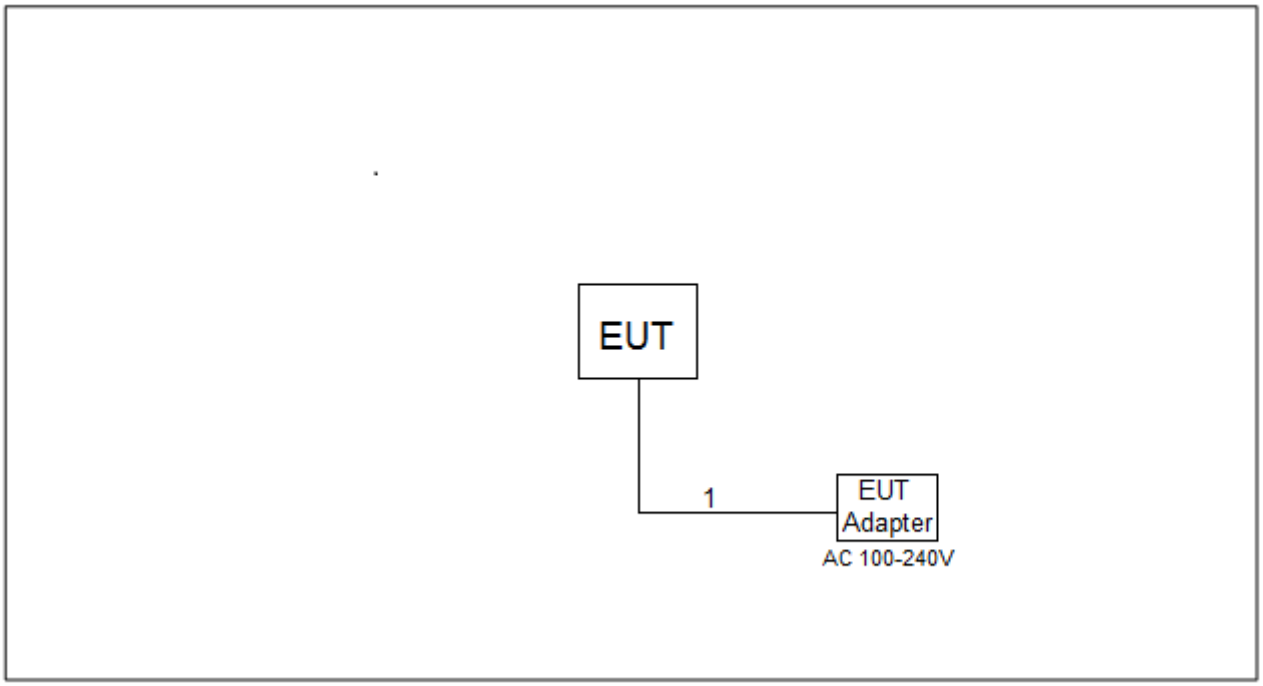
GSM MODE			
Test Item	Available Channel	Tested Channel	Mode
Output Power & EIRP	512 to 810	512, 661, 810	GSM, GPRS, EDGE
Occupied Bandwidth	512 to 810	512, 661, 810	GSM, EDGE
Conducted Spurious Emissions	512 to 810	661	GSM, EDGE
Radiated Spurious Emissions	512 to 810	661	GSM
Band Edge	512 to 810	512, 810	GSM, EDGE
Peak to Average Ratio	512 to 810	512, 661, 810	GSM, EDGE
Frequency Stability	512 to 810	661	GSM

WCDMA BAND II MODE			
Test Item	Available Channel	Tested Channel	Mode
Output Power & EIRP	9262 to 9538	9262, 9400, 9538	WCDMA, HSDPA,HSUPA
Occupied Bandwidth	9262 to 9538	9262, 9400, 9538	WCDMA, HSDPA,HSUPA
Conducted Spurious Emissions	9262 to 9538	9400	WCDMA
Radiated Spurious Emissions	9262 to 9538	9400	WCDMA
Band Edge	9262 to 9538	9262, 9538	WCDMA, HSDPA, HSUPA
Peak to Average Ratio	9262 to 9538	9262, 9400, 9538	WCDMA, HSDPA, HSUPA
Frequency Stability	9262 to 9538	9400	WCDMA

LTE BAND 2 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power & EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM, 64QAM	1RB/3RB/6RB
	18615 to 19185	18615 , 18900, 19185	3MHz	QPSK, 16QAM, 64QAM	1RB/8RB/15RB
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM, 64QAM	1RB/12RB/25RB
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM, 64QAM	1RB/25RB/50RB
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM, 64QAM	1RB/36RB/75RB
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM, 64QAM	1RB/50RB/100RB
Occupied Bandwidth	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM, 64QAM	6RB
	18615 to 19185	18615 , 18900, 19185	3MHz	QPSK, 16QAM, 64QAM	15RB
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM, 64QAM	25RB
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM, 64QAM	50RB
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM, 64QAM	75 RB
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM, 64QAM	100RB
Conducted Spurious Emissions	18607 to 19193	18900	1.4 MHz	QPSK	1RB
	18625 to 19175	18900	5MHz	QPSK	1RB
	18700 to 19100	18900	20MHz	QPSK	1RB
Radiated Spurious Emissions	18607 to 19193	18900	1.4 MHz	QPSK	1RB
	18625 to 19175	18900	5MHz	QPSK	1RB
	18700 to 19100	18900	20MHz	QPSK	1RB
Band Edge	18607 to 19193	18607, 19193	1.4MHz	QPSK	1RB/6RB
	18615 to 19185	18615, 19185	3MHz	QPSK	1RB/15RB
	18625 to 19175	18625, 19175	5MHz	QPSK	1RB/25RB
	18650 to 19150	18650, 19150	10MHz	QPSK	1RB/50RB
	18675 to 19125	18675, 19125	15MHz	QPSK	1RB/75RB
	18700 to 19100	18700, 19100	20MHz	QPSK	1RB/100RB
Peak To Average Ratio	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM, 64QAM	1RB
	18615 to 19185	18615 , 18900, 19185	3MHz	QPSK, 16QAM, 64QAM	1RB
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM, 64QAM	1RB
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM, 64QAM	1RB
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM, 64QAM	1RB
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM, 64QAM	1RB
Frequency Stability	18607 to 19193	18900	1.4MHz	QPSK	1RB
	18615 to 19185	18900	3MHz	QPSK	1RB
	18625 to 19175	18900	5MHz	QPSK	1RB
	18650 to 19150	18900	10MHz	QPSK	1RB
	18675 to 19125	18900	15MHz	QPSK	1RB
	18700 to 19100	18900	20MHz	QPSK	1RB

LTE BAND 25 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power & EIRP	26047 to 26683	26047, 26365, 22683	1.4MHz	QPSK, 16QAM, 64QAM	1RB/3RB/6RB
	26055 to 26675	26055, 26365, 26675	3MHz	QPSK, 16QAM, 64QAM	1RB/8RB/15RB
	26065 to 26665	26065, 26365, 26665	5MHz	QPSK, 16QAM, 64QAM	1RB/12RB/25RB
	26090 to 26640	26090, 26365, 26640	10MHz	QPSK, 16QAM, 64QAM	1RB/25RB/50RB
	26115 to 26615	26115, 26365, 26615	15MHz	QPSK, 16QAM, 64QAM	1RB/36RB/75RB
	26140 to 26590	26140, 26365, 26590	20MHz	QPSK, 16QAM, 64QAM	1RB/50RB/100RB
Occupied Bandwidth	26047 to 26683	26047, 26365, 22683	1.4MHz	QPSK, 16QAM, 64QAM	6RB
	26055 to 26675	26055, 26365, 26675	3MHz	QPSK, 16QAM, 64QAM	15RB
	26065 to 26665	26065, 26365, 26665	5MHz	QPSK, 16QAM, 64QAM	25RB
	26090 to 26640	26090, 26365, 26640	10MHz	QPSK, 16QAM, 64QAM	50RB
	26115 to 26615	26115, 26365, 26615	15MHz	QPSK, 16QAM, 64QAM	75 RB
	26140 to 26590	26140, 26365, 26590	20MHz	QPSK, 16QAM, 64QAM	100RB
Conducted Spurious Emissions	26047 to 26683	26365	1.4MHz	QPSK	1RB
	26065 to 26665	26365	5MHz	QPSK	1RB
	26140 to 26590	26365	20MHz	QPSK	1RB
Radiated Spurious Emissions	26047 to 26683	26365	1.4MHz	QPSK	1RB
	26065 to 26665	26365	5MHz	QPSK	1RB
	26140 to 26590	26365	20MHz	QPSK	1RB
Band Edge	26047 to 26683	26047, 26683	1.4MHz	QPSK	1RB/6RB
	26055 to 26675	26055, 26675	3MHz	QPSK	1RB/15RB
	26065 to 26665	26065, 26665	5MHz	QPSK	1RB/25RB
	26090 to 26640	26090, 26640	10MHz	QPSK	1RB/50RB
	26115 to 26615	26115, 26615	15MHz	QPSK	1RB/75RB
	26140 to 26590	26140, 26590	20MHz	QPSK	1RB/100RB
Peak To Average Ratio	26047 to 26683	26047, 26365, 22683	1.4MHz	QPSK, 16QAM, 64QAM	1RB
	26055 to 26675	26055, 26365, 26675	3MHz	QPSK, 16QAM, 64QAM	1RB
	26065 to 26665	26065, 26365, 26665	5MHz	QPSK, 16QAM, 64QAM	1RB
	26090 to 26640	26090, 26365, 26640	10MHz	QPSK, 16QAM, 64QAM	1RB
	26115 to 26615	26115, 26365, 26615	15MHz	QPSK, 16QAM, 64QAM	1RB
	26140 to 26590	26140, 26365, 26590	20MHz	QPSK, 16QAM, 64QAM	1RB
Frequency Stability	26047 to 26683	26365	1.4MHz	QPSK	1RB
	26055 to 26675	26365	3MHz	QPSK	1RB
	26065 to 26665	26365	5MHz	QPSK	1RB
	26090 to 26640	26365	10MHz	QPSK	1RB
	26115 to 26615	26365	15MHz	QPSK	1RB
	26140 to 26590	26365	20MHz	QPSK	1RB

2.3 BLOCKDIGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED



2.4 DESCRIPTION OF SUPPORT UNITS

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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m

3. TEST RESULT

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMIT

Mobile / Portable station are limited to 2 watts e.i.r.p.

3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.

EIRP:

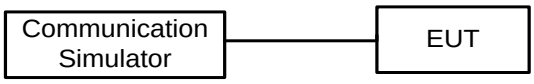
EIRP = Output Power + Antenan gain

Output Power:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA and LTE 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 LAYOUT

Output Power Measurement



3.1.4 TEST DEVIATION

No deviation

3.1.5 TEST RESULTS

Please refer to the APPENDIX A.

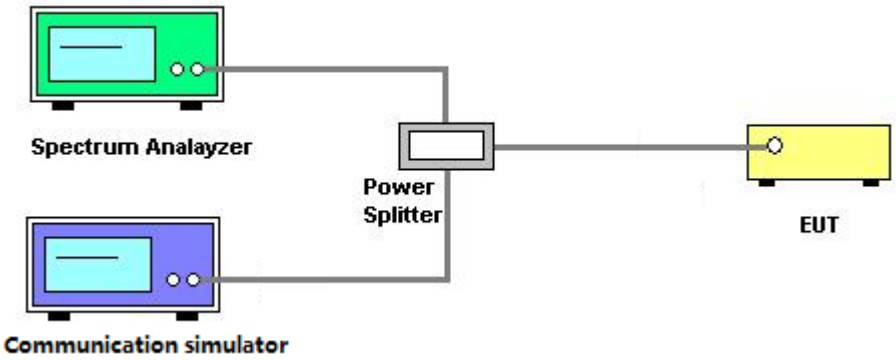
3.2 OCCUPIED BANDWIDTH MEASUREMENT

3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.

1. 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 and 26dB bandwidth.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. RBW=(1% ~ 5%)*EBW
   VBW⩾3* RBW
4. Set spectrum analyzer with Peak detector.

3.2.2 TEST SETUP LAYOUT



3.2.3 TEST DEVIATION

No deviation

3.2.4 TEST RESULTS

Please refer to the APPENDIX B.

3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

3.3.1 LIMIT

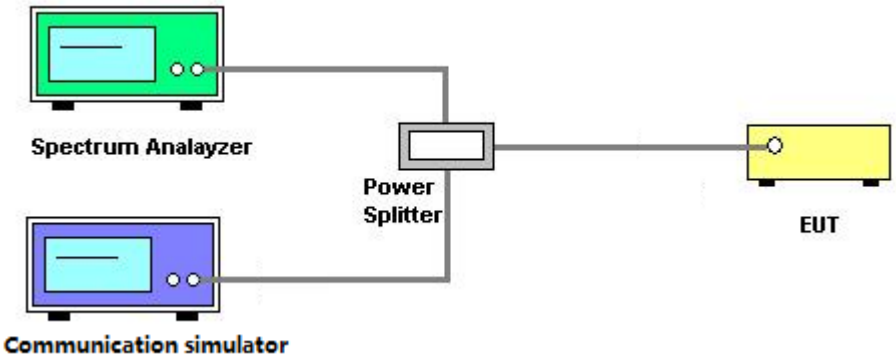
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW>=1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with Peak detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.3.3 TEST SETUP LAYOUT



3.3.4 TEST DEVIATION

No deviation

3.3.5 TEST RESULTS

Please refer to the APPENDIX C.

3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT

3.4.1 LIMIT

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.

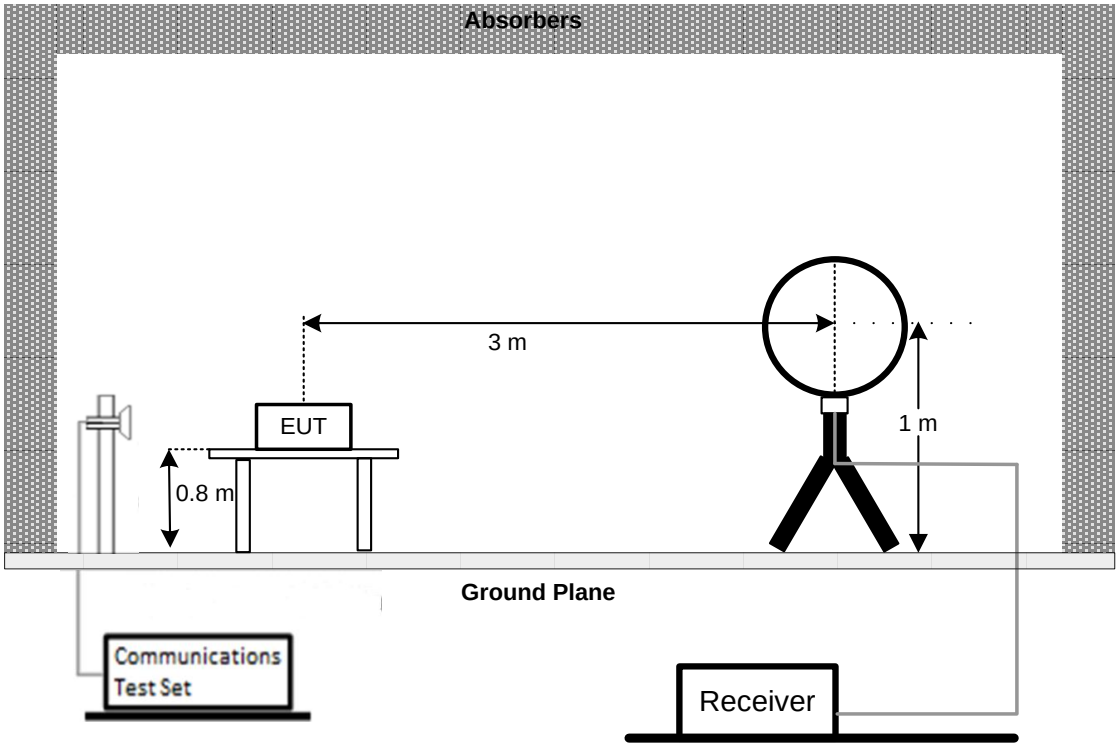
3.4.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.2.

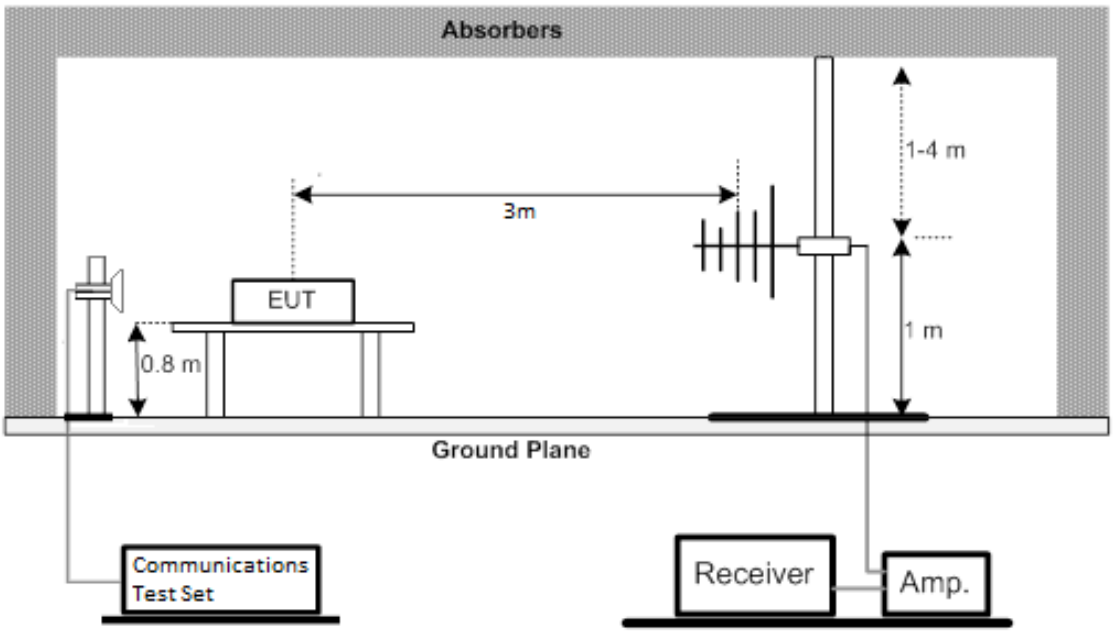
1. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
2. 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
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
4. ERP can be calculated form EIRP by subtracting the gain of dipole, ERP = EIPR - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.4.3 TEST SETUP LAYOUT

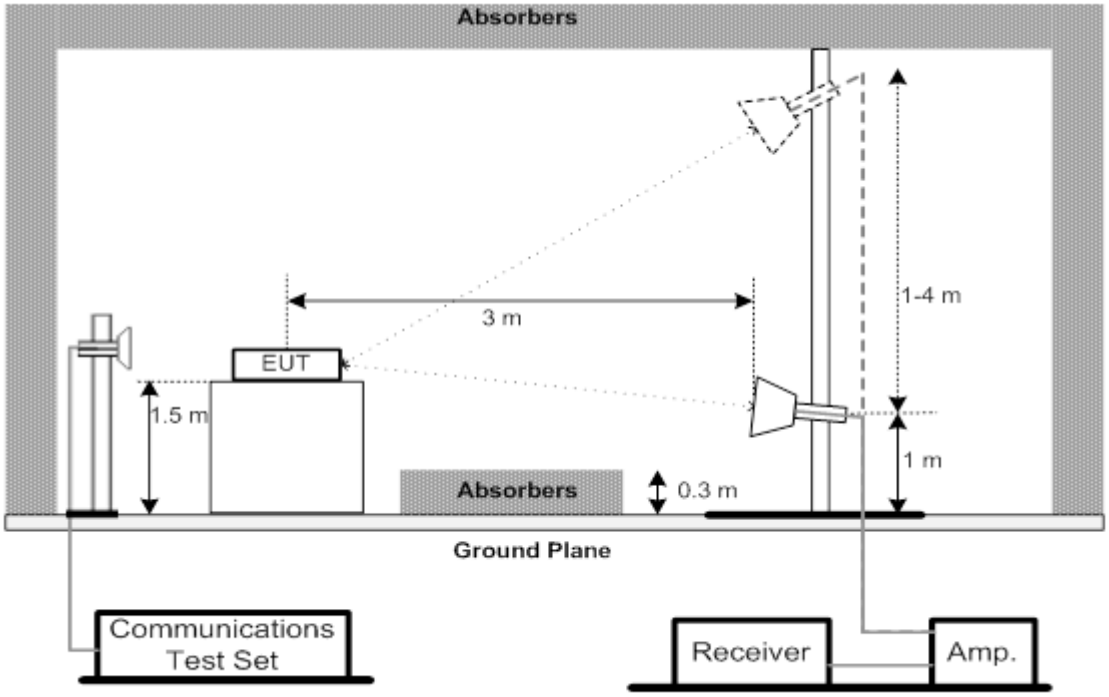
Below 30MHz



30MHz to 1000MHz



Above 1GHz



3.4.4 TEST DEVIATION

No deviation

3.4.5 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

3.4.7 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.

3.5 BAND EDGE MEASUREMENT

3.5.1 LIMIT

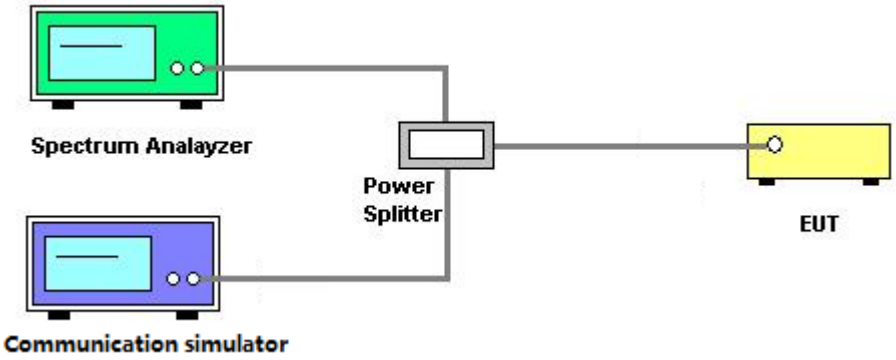
A Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.5.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. All measurements were done at low and high operational frequency range.
2. Record the max trace plot into the test report.

3.5.3 TEST SETUP LAYOUT



3.5.4 TEST DEVIATION

No deviation

3.5.5 TEST RESULTS

Please refer to the APPENDIX G.

3.6 PEAK TO AVERAGE RATIO MEASUREMENT

3.6.1 LIMIT

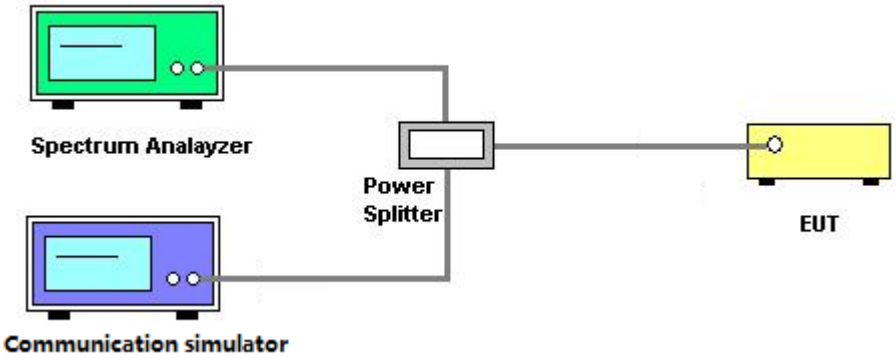
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

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%.

3.6.3 TEST SETUP LAYOUT



3.6.4 TEST DEVIATION

No deviation

3.6.5 TEST RESULTS

Please refer to the APPENDIX H.

3.7 FREQUENCY STABILITY MEASUREMENT

3.7.1 LIMIT

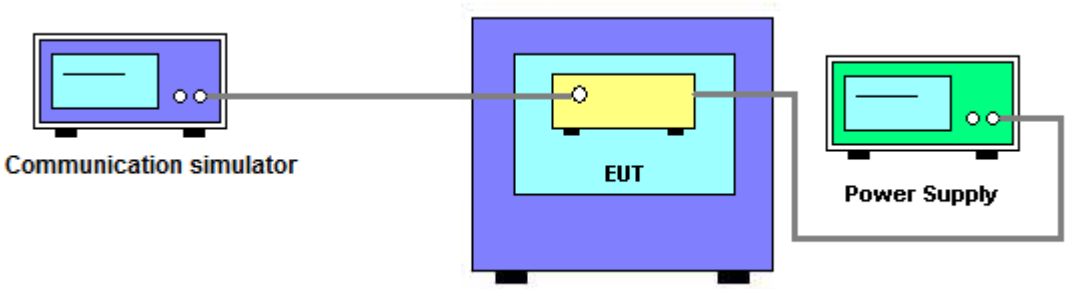
±1.5 ppm is for base and fixed station. ±2.5 ppm is for mobile station.

3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.

1. 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.
2. 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.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5°C 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.
4. The frequency error was recorded frequency error from the communication simulator.

3.7.3 TEST SETUP LAYOUT



3.7.4 TEST DEVIATION

No deviation

3.7.5 TEST RESULTS

Please refer to the APPENDIX I.

4. LIST OF MEASUREMENT EQUIPMENTS

Radiated Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3231	Apr. 17, 2021
2	Amplifier	Agilent	8449B	3008A02334	Feb. 27, 2022
3	HighPass Filter	Wairrwright Instruments Gmbh	WHK 1.5/15G-10ST	11	Feb. 27, 2022
4	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 1710/1785-1690/1805-60/12SS	38	Feb. 27, 2022
5	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 824/849-810/863-60/9SS	7	Feb. 27, 2022
6	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 880/915-860/935-60/9SS	14	Feb. 27, 2022
7	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 1850/1910-1830/1930-60/10SS	17	Feb. 27, 2022
8	HighPass Filter	Wairrwright Instruments Gmbh	WHK3.1/18G-10SS	24	Feb. 27, 2022
9	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
10	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 28, 2022
11	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021
12	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
13	High pass filter	KANGMAIWEI	ZHPF-M3-12.75G-3869	B2015073763	Feb. 07, 2022
14	High pass filter	KANGMAIWEI	ZHPF-M1000-4000-1	B2015073762	Feb. 07, 2022
15	High pass filter	KANGMAIWEI	ZHPF-M6-186-1727	B2015073764	Feb. 07, 2022
16	Cable	emci	LMR-400(30MHz-1GHz) (8m+5m)	N/A	May 23, 2021
17	Cable	mitron	B10-01-01-12M	18072744	Jun. 28, 2021
18	Controller	ETS-Lindgren	2090	N/A	N/A
19	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
20	Loop Antenna	EM	EM-6876-1	230	Apr. 16, 2021
21	Double Ridged Guide Antenna	ETS	3115	75846	Mar. 19, 2021
22	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jul. 07, 2021

Conducted Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Feb. 28, 2022
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022

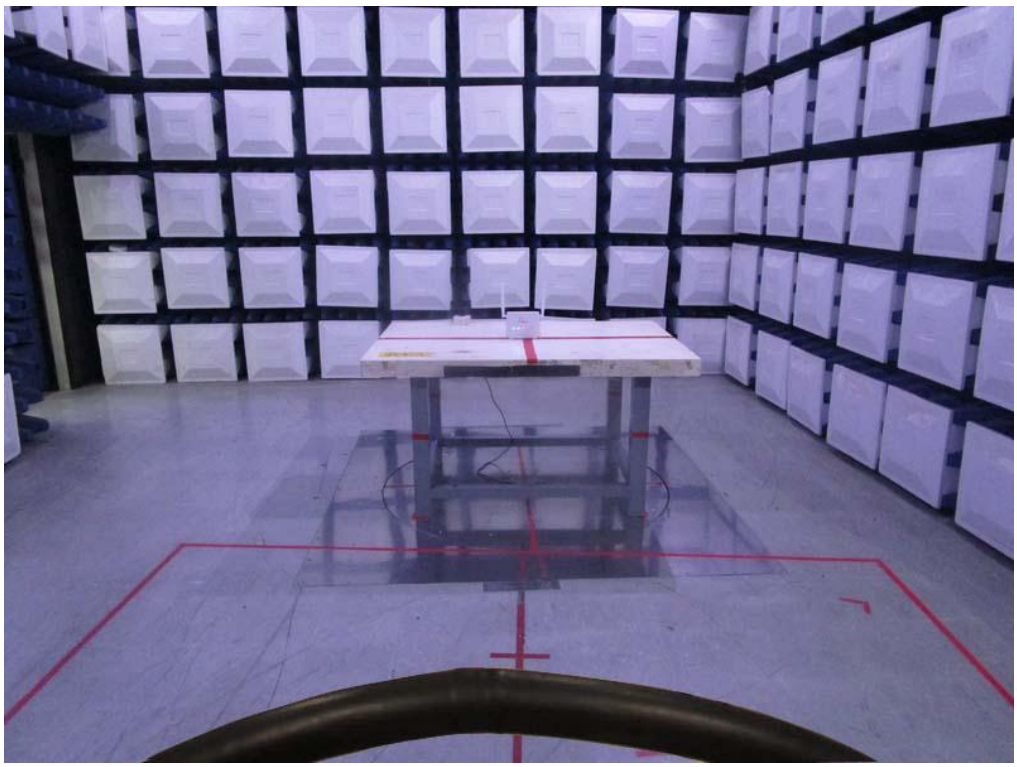
Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2*	Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 25, 2023
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
5	Const Temp,& Humidity Chamber	Bell	BTH-50C	20170306001	Feb. 27, 2022

Remark: ”N/A” denotes no model name, serial no. or calibration specified.
“*” calibration period of equipment list is three year.
Except * item, all calibration period of equipment list is one year.

5. EUT TEST PHOTO

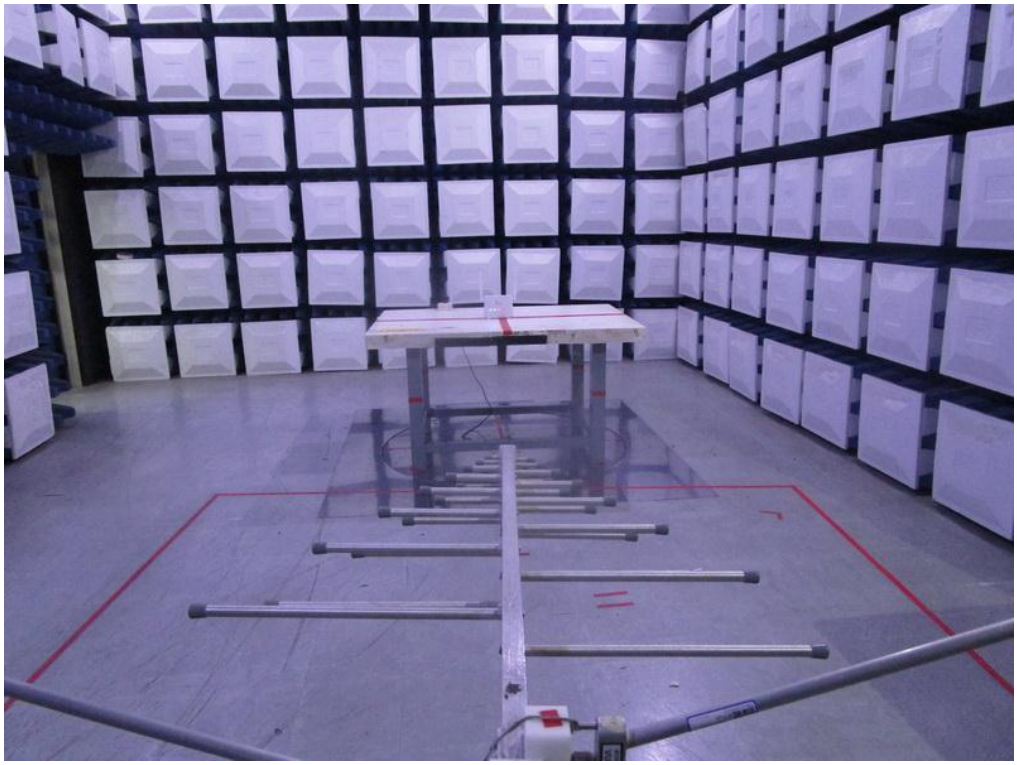
Radiated Emissions Test Photos

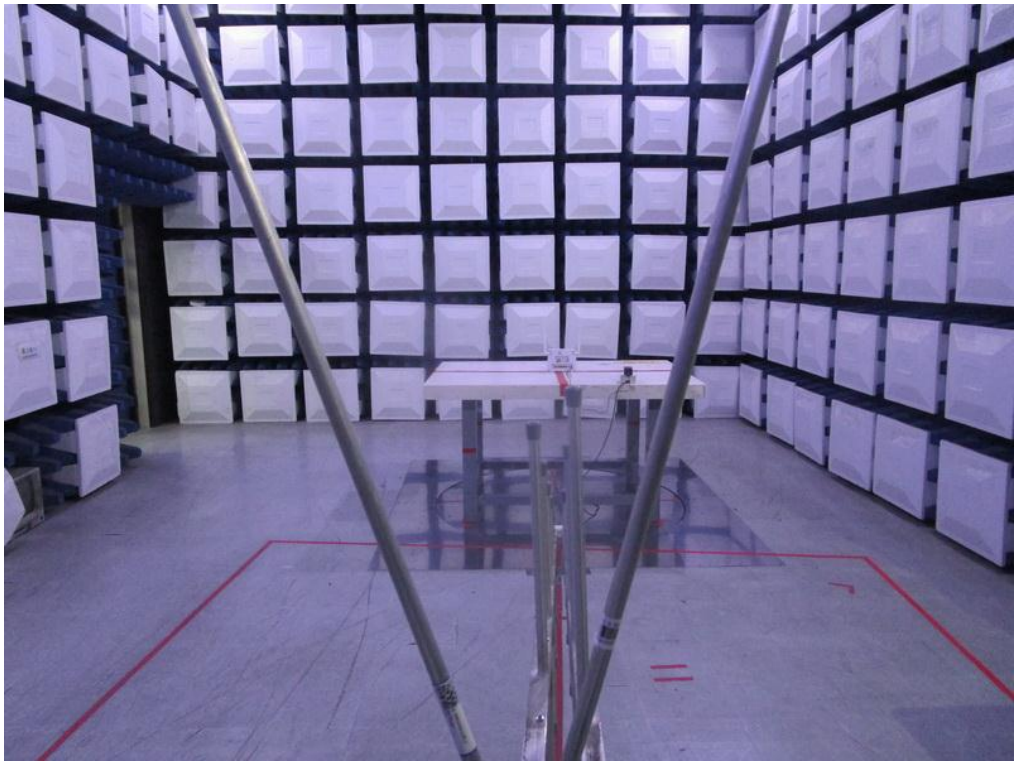
9 kHz to 30 MHz



Radiated Emissions Test Photos

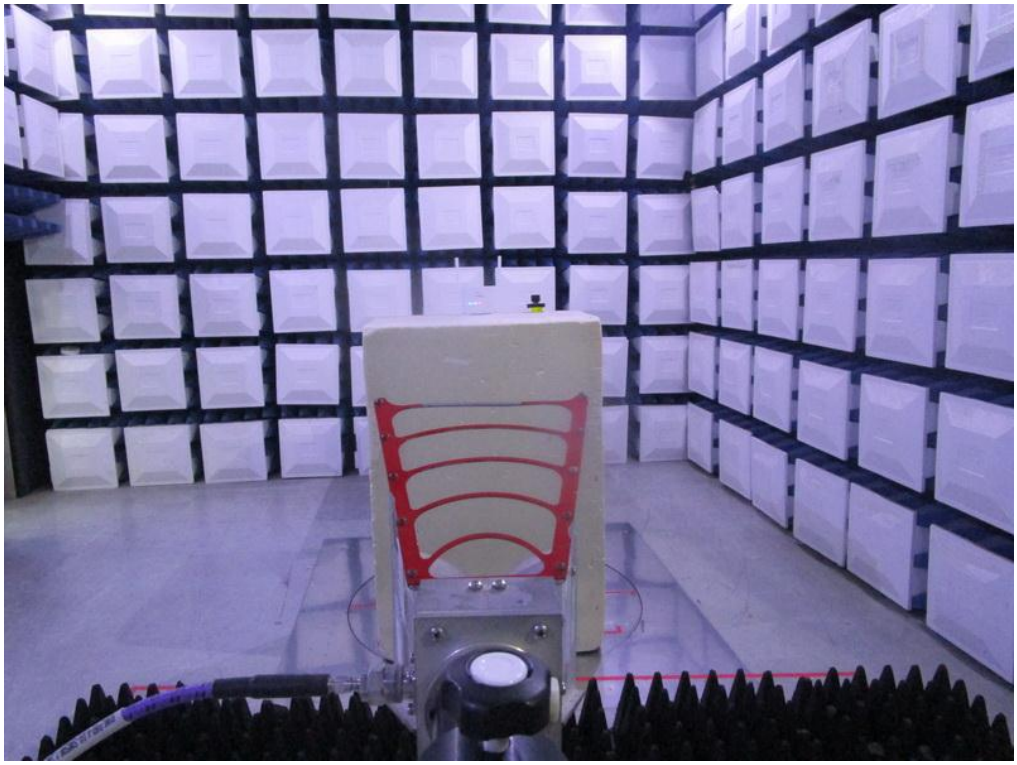
30 MHz to 1 GHz

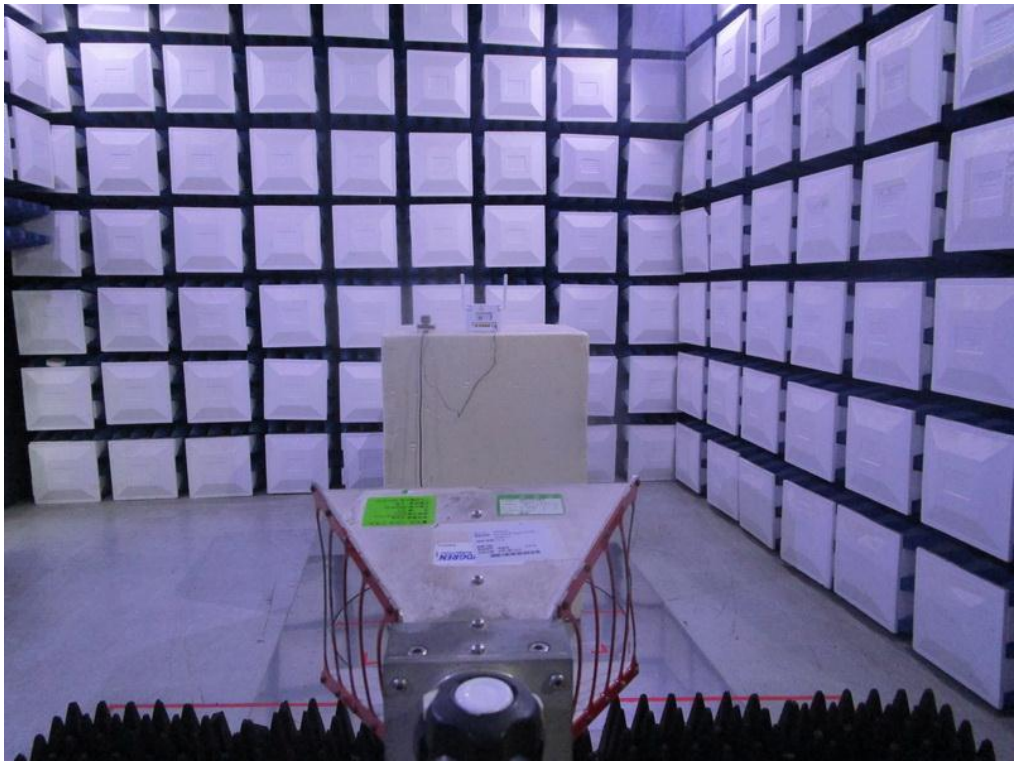




Radiated Emissions Test Photos

Above 1 GHz





APPENDIX A - OUTPUT POWER

Output Power (dBm):

PCS1900		512CH	661CH	810CH
		1850.2MHz	1880MHz	1909.8MHz
GSM (CS)		29.22	29.06	28.89
GPRS/EDGE (GMSK)	1 Tx Slot	29.67	29.51	29.52
	2 Tx Slot	27.59	27.49	27.41
	3 Tx Slot	26.42	26.27	26.22
	4 Tx Slot	24.99	24.93	25.05
EDGE (8PSK)	1 Tx Slot	29.65	29.51	29.55
	2 Tx Slot	27.54	27.43	27.48
	3 Tx Slot	26.4	26.38	26.23
	4 Tx Slot	25.1	24.98	24.96

Modulation	Band	WCDMA Band II		
	Tx Channel	9262CH	9400CH	9538CH
	Frequency	1852.4MHz	1880MHz	1907.6MHz
QPSK	RMC 12.2K	22.42	22.35	22.44
	RMC 64K	22.59	22.42	22.54
	RMC 144K	22.42	22.45	22.54
	RMC 384K	22.49	22.43	22.43
	HSDPA Subtest-1	21.2	20.84	20.97
	HSDPA Subtest-2	21.17	20.86	20.97
	HSDPA Subtest-3	20.67	20.37	20.5
	HSDPA Subtest-4	20.69	20.34	20.5
	HSUPA Subtest-1	21.08	20.94	21.09
	HSUPA Subtest-2	19.13	18.95	19.13
	HSUPA Subtest-3	20.08	19.98	20.09
	HSUPA Subtest-4	19.13	18.99	19.12
	HSUPA Subtest-5	20.83	20.77	21.04

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18607CH	18900CH	19193CH
				1850.7MHz	1880MHz	1909.3MHz
2 / 1.4M	QPSK	1	0	21.84	21.95	21.83
		1	2	21.92	21.95	21.83
		1	5	21.83	22.01	21.77
		3	0	21.94	22.01	21.96
		3	1	22.01	22.07	21.96
		3	2	21.95	22.03	21.91
		6	0	20.94	20.99	20.89
	16QAM	1	0	20.76	21.24	20.79
		1	2	20.81	21.22	20.77
		1	5	20.73	21.07	20.70
		3	0	20.84	20.95	20.93
		3	1	20.84	21.03	21.00
		3	2	20.82	20.96	20.92
		6	0	19.86	19.69	19.85
	64QAM	1	0	20.02	20.29	19.93
		1	2	20.03	20.34	19.91
		1	5	19.84	20.22	19.83
		3	0	19.73	20.24	19.91
		3	1	19.75	20.28	19.93
		3	2	19.70	20.24	19.91
		6	0	18.82	18.86	19.03

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18615CH	18900CH	19185CH
				1851.5MHz	1880MHz	1908.5MHz
2 / 3M	QPSK	1	0	21.92	21.98	21.86
		1	7	21.87	22.12	21.95
		1	14	21.78	21.93	21.77
		8	0	20.94	21.01	20.95
		8	4	20.95	21.09	20.97
		8	7	20.92	21.04	20.92
		15	0	20.92	21.06	20.97
	16QAM	1	0	20.65	21.18	20.75
		1	7	20.75	21.30	20.88
		1	14	20.57	21.00	20.61
		8	0	19.88	19.90	19.82
		8	4	19.89	19.91	19.81
		8	7	19.86	19.90	19.81
		15	0	19.80	19.87	19.71
	64QAM	1	0	20.07	19.97	20.03
		1	7	20.08	20.04	20.05
		1	14	19.99	19.76	19.84
		8	0	18.85	18.83	18.75
		8	4	18.85	18.89	18.75
		8	7	18.82	18.88	18.72
		15	0	18.77	18.87	18.84

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18625CH	18900CH	19175CH
				1852.5MHz	1880MHz	1907.5MHz
2 / 5M	QPSK	1	0	22.08	22.00	22.06
		1	13	22.11	22.02	22.07
		1	24	21.91	21.76	21.91
		12	0	20.94	20.98	20.99
		12	6	20.96	21.05	21.00
		12	11	20.93	21.01	20.93
		25	0	20.92	21.01	20.92
	16QAM	1	0	20.95	21.39	20.96
		1	13	20.93	21.40	20.91
		1	24	20.74	21.13	20.75
		12	0	19.83	19.91	19.86
		12	6	19.88	19.97	19.85
		12	11	19.82	20.00	19.81
		25	0	19.75	19.90	19.73
	64QAM	1	0	19.75	20.24	20.14
		1	13	19.76	20.26	20.14
		1	24	19.57	19.88	19.90
		12	0	18.86	18.75	18.87
		12	6	18.83	18.80	18.88
		12	11	18.77	18.72	18.83
		25	0	18.73	18.79	18.79

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18650CH	18900CH	19150CH
				1855MHz	1880MHz	1905MHz
2 / 10M	QPSK	1	0	22.23	22.09	22.32
		1	25	21.87	22.00	21.85
		1	49	21.93	21.79	21.73
		25	0	21.22	21.11	21.11
		25	13	21.03	21.07	20.99
		25	25	20.98	20.85	20.86
		50	0	21.11	20.96	21.01
	16QAM	1	0	20.98	21.29	21.16
		1	25	20.66	21.16	20.68
		1	49	20.66	20.98	20.55
		25	0	20.02	19.95	20.00
		25	13	19.82	19.91	19.85
		25	25	19.82	19.67	19.69
		50	0	19.91	19.79	19.82
	64QAM	1	0	20.39	20.07	20.40
		1	25	20.12	19.94	19.88
		1	49	20.10	19.71	19.72
		25	0	18.98	18.95	19.04
		25	13	18.88	18.97	18.87
		25	25	18.81	18.73	18.72
		50	0	18.91	18.79	18.87

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18675CH	18900CH	19125CH
				1857.5MHz	1880MHz	1902.5MHz
2 / 15M	QPSK	1	0	22.58	22.48	22.43
		1	38	22.04	21.86	21.90
		1	74	22.05	22.12	22.10
		36	0	21.29	21.13	21.12
		36	18	21.13	20.99	20.96
		36	39	21.02	21.02	20.93
		75	0	21.08	21.02	20.99
	16QAM	1	0	21.11	21.62	21.68
		1	38	20.61	21.01	21.19
		1	74	20.62	21.25	21.24
		36	0	19.90	19.98	19.83
		36	18	19.77	19.86	19.80
		36	39	19.70	19.82	19.78
		75	0	19.83	19.85	19.89
	64QAM	1	0	20.54	20.38	20.87
		1	38	20.05	19.83	20.31
		1	74	20.03	20.00	20.37
		36	0	18.96	19.02	18.95
		36	18	18.85	18.88	18.84
		36	39	18.73	18.88	18.79
		75	0	18.86	18.83	18.95

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18700CH	18900CH	19100CH
				1860MHz	1880MHz	1900MHz
2 / 20M	QPSK	1	0	22.64	22.65	22.59
		1	50	21.77	21.69	21.72
		1	99	22.06	22.08	22.07
		50	0	21.24	21.15	21.06
		50	25	20.95	20.85	20.81
		50	50	20.92	20.97	20.91
		100	0	21.14	21.12	21.04
	16QAM	1	0	22.08	22.33	21.96
		1	50	21.28	21.42	21.09
		1	99	21.49	21.68	21.40
		50	0	20.15	20.23	20.04
		50	25	19.89	19.88	19.80
		50	50	19.81	19.98	19.90
		100	0	20.04	20.12	20.04
	64QAM	1	0	21.17	21.43	20.97
		1	50	20.31	20.56	20.04
		1	99	20.60	20.90	20.37
		50	0	19.40	19.22	19.17
		50	25	19.14	18.92	18.91
		50	50	19.08	19.08	18.98
		100	0	19.21	19.16	19.12

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26047CH	26365CH	26683CH
				1850.7MHz	1882.5MHz	1914.3MHz
25 / 1.4M	QPSK	1	0	21.89	21.97	22.01
		1	2	21.97	21.97	21.95
		1	5	21.89	21.94	21.87
		3	0	21.94	21.96	21.95
		3	1	21.99	21.99	22.00
		3	2	21.94	22.02	21.96
		6	0	20.91	20.95	20.89
	16QAM	1	0	20.86	21.13	21.33
		1	2	20.88	21.04	21.23
		1	5	20.77	20.99	21.12
		3	0	20.95	20.94	21.05
		3	1	20.98	20.99	20.96
		3	2	20.92	20.99	20.92
		6	0	19.91	20.04	19.64
	64QAM	1	0	19.92	20.48	20.09
		1	2	19.97	20.31	19.87
		1	5	19.90	20.21	19.86
		3	0	19.74	20.14	19.75
		3	1	19.69	20.17	19.78
		3	2	19.55	20.14	19.74
		6	0	18.72	18.81	18.87

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26055CH	26365CH	26675CH
				1851.5MHz	1882.5MHz	1913.5MHz
25 / 3M	QPSK	1	0	21.89	22.05	22.12
		1	7	21.96	22.12	22.06
		1	14	21.84	22.04	21.87
		8	0	20.94	20.95	21.05
		8	4	20.96	20.99	21.03
		8	7	20.88	20.98	20.97
		15	0	20.94	20.97	20.99
	16QAM	1	0	20.69	21.40	21.13
		1	7	20.81	21.41	20.91
		1	14	20.62	21.34	20.68
		8	0	19.90	20.01	19.93
		8	4	19.93	20.03	19.87
		8	7	19.80	19.99	19.79
		15	0	19.83	19.98	19.72
	64QAM	1	0	19.91	20.22	20.32
		1	7	20.04	20.04	19.93
		1	14	19.84	19.96	19.79
		8	0	18.69	18.80	18.69
		8	4	18.77	18.90	18.66
		8	7	18.66	18.89	18.56
		15	0	18.68	18.85	18.71

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26065CH	26365CH	26665CH
				1852.5MHz	1882.5MHz	1912.5MHz
25 / 5M	QPSK	1	0	21.99	22.14	22.32
		1	13	21.99	22.09	22.16
		1	24	21.91	22.03	21.98
		12	0	20.86	20.95	21.03
		12	6	20.84	21.01	20.98
		12	11	20.84	21.00	20.85
		25	0	20.91	20.98	20.90
	16QAM	1	0	20.88	21.65	21.38
		1	13	20.87	21.41	21.00
		1	24	20.81	21.31	20.81
		12	0	19.73	19.94	19.96
		12	6	19.71	19.98	19.90
		12	11	19.73	20.01	19.78
		25	0	19.89	19.90	19.78
	64QAM	1	0	19.62	20.48	20.52
		1	13	19.63	20.11	20.05
		1	24	19.57	19.93	19.86
		12	0	18.73	18.63	18.87
		12	6	18.71	18.69	18.82
		12	11	18.69	18.66	18.69
		25	0	18.72	18.66	18.73

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26090CH	26365CH	26640CH
				1855MHz	1882.5MHz	1910MHz
25 / 10M	QPSK	1	0	21.99	22.25	22.22
		1	25	21.80	21.94	22.08
		1	49	21.87	22.01	21.92
		25	0	20.97	21.03	21.14
		25	13	20.93	20.94	21.08
		25	25	20.93	20.94	21.03
		50	0	20.93	20.98	21.11
	16QAM	1	0	20.84	21.54	21.14
		1	25	20.63	21.16	20.88
		1	49	20.67	21.24	20.67
		25	0	19.73	19.94	19.99
		25	13	19.70	19.92	19.93
		25	25	19.74	19.84	19.81
		50	0	19.70	19.93	19.87
	64QAM	1	0	20.13	20.28	20.33
		1	25	20.00	19.78	20.05
		1	49	20.07	19.89	19.76
		25	0	18.79	18.87	18.92
		25	13	18.77	18.82	18.93
		25	25	18.81	18.81	18.86
		50	0	18.75	18.82	18.86

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26115CH	26365CH	26615CH
				1857.5MHz	1882.5MHz	1907.5MHz
25 / 15M	QPSK	1	0	22.32	22.66	22.64
		1	38	21.66	21.97	22.03
		1	74	21.98	22.09	22.27
		36	0	21.07	21.10	21.16
		36	18	20.84	20.96	21.01
		36	39	20.79	20.99	21.03
		75	0	20.91	21.07	21.03
	16QAM	1	0	21.11	21.84	21.96
		1	38	20.52	21.09	21.26
		1	74	20.83	21.23	21.46
		36	0	19.93	19.93	19.88
		36	18	19.71	19.79	19.87
		36	39	19.71	19.73	19.82
		75	0	19.73	19.88	19.94
	64QAM	1	0	20.45	20.49	20.83
		1	38	19.78	19.75	20.20
		1	74	20.08	19.93	20.44
		36	0	18.87	18.98	18.89
		36	18	18.68	18.86	18.80
		36	39	18.65	18.84	18.75
		75	0	18.71	18.89	18.94

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26140CH	26365CH	26590CH
				1860MHz	1882.5MHz	1905MHz
25 / 20M	QPSK	1	0	22.64	22.74	22.64
		1	50	21.78	21.82	21.68
		1	99	22.23	22.10	22.05
		50	0	21.20	21.17	20.99
		50	25	20.92	20.89	20.87
		50	50	21.02	20.97	20.95
		100	0	21.06	21.01	20.98
	16QAM	1	0	22.10	22.13	22.04
		1	50	21.16	21.13	21.04
		1	99	21.56	21.43	21.42
		50	0	19.95	20.04	19.92
		50	25	19.79	19.73	19.76
		50	50	19.82	19.88	19.77
		100	0	19.93	19.95	19.87
	64QAM	1	0	20.75	21.32	20.95
		1	50	19.81	20.32	19.99
		1	99	20.33	20.60	20.39
		50	0	18.95	18.99	19.06
		50	25	18.77	18.72	18.91
		50	50	18.80	18.80	18.96
		100	0	18.89	18.81	19.01

EIRP (dBm):

PCS1900		512CH	661CH	810CH
		1850.2MHz	1880MHz	1909.8MHz
GSM (CS)		32.22	32.06	31.89
GPRS/EDGE (GMSK)	1 Tx Slot	32.67	32.51	32.52
	2 Tx Slot	30.59	30.49	30.41
	3 Tx Slot	29.42	29.27	29.22
	4 Tx Slot	27.99	27.93	28.05
EDGE (8PSK)	1 Tx Slot	32.65	32.51	32.55
	2 Tx Slot	30.54	30.43	30.48
	3 Tx Slot	29.40	29.38	29.23
	4 Tx Slot	28.10	27.98	27.96

Modulation	Band	WCDMA Band II		
	Tx Channel	9262CH	9400CH	9538CH
	Frequency	1852.4MHz	1880MHz	1907.6MHz
QPSK	RMC 12.2K	25.42	25.35	25.44
	RMC 64K	25.59	25.42	25.54
	RMC 144K	25.42	25.45	25.54
	RMC 384K	25.49	25.43	25.43
	HSDPA Subtest-1	24.20	23.84	23.97
	HSDPA Subtest-2	24.17	23.86	23.97
	HSDPA Subtest-3	23.67	23.37	23.50
	HSDPA Subtest-4	23.69	23.34	23.50
	HSUPA Subtest-1	24.08	23.94	24.09
	HSUPA Subtest-2	22.13	21.95	22.13
	HSUPA Subtest-3	23.08	22.98	23.09
	HSUPA Subtest-4	22.13	21.99	22.12
	HSUPA Subtest-5	23.83	23.77	24.04

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18607CH	18900CH	19193CH
				1850.7MHz	1880MHz	1909.3MHz
2 / 1.4M	QPSK	1	0	24.84	24.95	24.83
		1	2	24.92	24.95	24.83
		1	5	24.83	25.01	24.77
		3	0	24.94	25.01	24.96
		3	1	25.01	25.07	24.96
		3	2	24.95	25.03	24.91
		6	0	23.94	23.99	23.89
	16QAM	1	0	23.76	24.24	23.79
		1	2	23.81	24.22	23.77
		1	5	23.73	24.07	23.70
		3	0	23.84	23.95	23.93
		3	1	23.84	24.03	24.00
		3	2	23.82	23.96	23.92
		6	0	22.86	22.69	22.85
	64QAM	1	0	23.02	23.29	22.93
		1	2	23.03	23.34	22.91
		1	5	22.84	23.22	22.83
		3	0	22.73	23.24	22.91
		3	1	22.75	23.28	22.93
		3	2	22.70	23.24	22.91
		6	0	21.82	21.86	22.03

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18615CH	18900CH	19185CH
				1851.5MHz	1880MHz	1908.5MHz
2 / 3M	QPSK	1	0	24.92	24.98	24.86
		1	7	24.87	25.12	24.95
		1	14	24.78	24.93	24.77
		8	0	23.94	24.01	23.95
		8	4	23.95	24.09	23.97
		8	7	23.92	24.04	23.92
		15	0	23.92	24.06	23.97
	16QAM	1	0	23.65	24.18	23.75
		1	7	23.75	24.30	23.88
		1	14	23.57	24.00	23.61
		8	0	22.88	22.90	22.82
		8	4	22.89	22.91	22.81
		8	7	22.86	22.90	22.81
		15	0	22.80	22.87	22.71
	64QAM	1	0	23.07	22.97	23.03
		1	7	23.08	23.04	23.05
		1	14	22.99	22.76	22.84
		8	0	21.85	21.83	21.75
		8	4	21.85	21.89	21.75
		8	7	21.82	21.88	21.72
		15	0	21.77	21.87	21.84

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18625CH	18900CH	19175CH
				1852.5MHz	1880MHz	1907.5MHz
2 / 5M	QPSK	1	0	25.08	25.00	25.06
		1	13	25.11	25.02	25.07
		1	24	24.91	24.76	24.91
		12	0	23.94	23.98	23.99
		12	6	23.96	24.05	24.00
		12	11	23.93	24.01	23.93
		25	0	23.92	24.01	23.92
	16QAM	1	0	23.95	24.39	23.96
		1	13	23.93	24.40	23.91
		1	24	23.74	24.13	23.75
		12	0	22.83	22.91	22.86
		12	6	22.88	22.97	22.85
		12	11	22.82	23.00	22.81
		25	0	22.75	22.90	22.73
	64QAM	1	0	22.75	23.24	23.14
		1	13	22.76	23.26	23.14
		1	24	22.57	22.88	22.90
		12	0	21.86	21.75	21.87
		12	6	21.83	21.80	21.88
		12	11	21.77	21.72	21.83
		25	0	21.73	21.79	21.79

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18650CH	18900CH	19150CH
				1855MHz	1880MHz	1905MHz
2 / 10M	QPSK	1	0	25.23	25.09	25.32
		1	25	24.87	25.00	24.85
		1	49	24.93	24.79	24.73
		25	0	24.22	24.11	24.11
		25	13	24.03	24.07	23.99
		25	25	23.98	23.85	23.86
		50	0	24.11	23.96	24.01
	16QAM	1	0	23.98	24.29	24.16
		1	25	23.66	24.16	23.68
		1	49	23.66	23.98	23.55
		25	0	23.02	22.95	23.00
		25	13	22.82	22.91	22.85
		25	25	22.82	22.67	22.69
		50	0	22.91	22.79	22.82
	64QAM	1	0	23.39	23.07	23.40
		1	25	23.12	22.94	22.88
		1	49	23.10	22.71	22.72
		25	0	21.98	21.95	22.04
		25	13	21.88	21.97	21.87
		25	25	21.81	21.73	21.72
		50	0	21.91	21.79	21.87

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18675CH	18900CH	19125CH
				1857.5MHz	1880MHz	1902.5MHz
2 / 15M	QPSK	1	0	25.58	25.48	25.43
		1	38	25.04	24.86	24.90
		1	74	25.05	25.12	25.10
		36	0	24.29	24.13	24.12
		36	18	24.13	23.99	23.96
		36	39	24.02	24.02	23.93
		75	0	24.08	24.02	23.99
	16QAM	1	0	24.11	24.62	24.68
		1	38	23.61	24.01	24.19
		1	74	23.62	24.25	24.24
		36	0	22.90	22.98	22.83
		36	18	22.77	22.86	22.80
		36	39	22.70	22.82	22.78
		75	0	22.83	22.85	22.89
	64QAM	1	0	23.54	23.38	23.87
		1	38	23.05	22.83	23.31
		1	74	23.03	23.00	23.37
		36	0	21.96	22.02	21.95
		36	18	21.85	21.88	21.84
		36	39	21.73	21.88	21.79
		75	0	21.86	21.83	21.95

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				18700CH	18900CH	19100CH
				1860MHz	1880MHz	1900MHz
2 / 20M	QPSK	1	0	25.64	25.65	25.59
		1	50	24.77	24.69	24.72
		1	99	25.06	25.08	25.07
		50	0	24.24	24.15	24.06
		50	25	23.95	23.85	23.81
		50	50	23.92	23.97	23.91
		100	0	24.14	24.12	24.04
	16QAM	1	0	25.08	25.33	24.96
		1	50	24.28	24.42	24.09
		1	99	24.49	24.68	24.40
		50	0	23.15	23.23	23.04
		50	25	22.89	22.88	22.80
		50	50	22.81	22.98	22.90
		100	0	23.04	23.12	23.04
	64QAM	1	0	24.17	24.43	23.97
		1	50	23.31	23.56	23.04
		1	99	23.60	23.90	23.37
		50	0	22.40	22.22	22.17
		50	25	22.14	21.92	21.91
		50	50	22.08	22.08	21.98
		100	0	22.21	22.16	22.12

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26047CH	26365CH	26683CH
				1850.7MHz	1882.5MHz	1914.3MHz
25 / 1.4M	QPSK	1	0	24.89	24.97	25.01
		1	2	24.97	24.97	24.95
		1	5	24.89	24.94	24.87
		3	0	24.94	24.96	24.95
		3	1	24.99	24.99	25.00
		3	2	24.94	25.02	24.96
		6	0	23.91	23.95	23.89
	16QAM	1	0	23.86	24.13	24.33
		1	2	23.88	24.04	24.23
		1	5	23.77	23.99	24.12
		3	0	23.95	23.94	24.05
		3	1	23.98	23.99	23.96
		3	2	23.92	23.99	23.92
		6	0	22.91	23.04	22.64
	64QAM	1	0	22.92	23.48	23.09
		1	2	22.97	23.31	22.87
		1	5	22.90	23.21	22.86
		3	0	22.74	23.14	22.75
		3	1	22.69	23.17	22.78
		3	2	22.55	23.14	22.74
		6	0	21.72	21.81	21.87

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26055CH	26365CH	26675CH
				1851.5MHz	1882.5MHz	1913.5MHz
25 / 3M	QPSK	1	0	24.89	25.05	25.12
		1	7	24.96	25.12	25.06
		1	14	24.84	25.04	24.87
		8	0	23.94	23.95	24.05
		8	4	23.96	23.99	24.03
		8	7	23.88	23.98	23.97
		15	0	23.94	23.97	23.99
	16QAM	1	0	23.69	24.40	24.13
		1	7	23.81	24.41	23.91
		1	14	23.62	24.34	23.68
		8	0	22.90	23.01	22.93
		8	4	22.93	23.03	22.87
		8	7	22.80	22.99	22.79
		15	0	22.83	22.98	22.72
	64QAM	1	0	22.91	23.22	23.32
		1	7	23.04	23.04	22.93
		1	14	22.84	22.96	22.79
		8	0	21.69	21.80	21.69
		8	4	21.77	21.90	21.66
		8	7	21.66	21.89	21.56
		15	0	21.68	21.85	21.71

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26065CH	26365CH	26665CH
				1852.5MHz	1882.5MHz	1912.5MHz
25 / 5M	QPSK	1	0	24.99	25.14	25.32
		1	13	24.99	25.09	25.16
		1	24	24.91	25.03	24.98
		12	0	23.86	23.95	24.03
		12	6	23.84	24.01	23.98
		12	11	23.84	24.00	23.85
		25	0	23.91	23.98	23.90
	16QAM	1	0	23.88	24.65	24.38
		1	13	23.87	24.41	24.00
		1	24	23.81	24.31	23.81
		12	0	22.73	22.94	22.96
		12	6	22.71	22.98	22.90
		12	11	22.73	23.01	22.78
		25	0	22.89	22.90	22.78
	64QAM	1	0	22.62	23.48	23.52
		1	13	22.63	23.11	23.05
		1	24	22.57	22.93	22.86
		12	0	21.73	21.63	21.87
		12	6	21.71	21.69	21.82
		12	11	21.69	21.66	21.69
		25	0	21.72	21.66	21.73

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26090CH	26365CH	26640CH
				1855MHz	1882.5MHz	1910MHz
25 / 10M	QPSK	1	0	24.99	25.25	25.22
		1	25	24.80	24.94	25.08
		1	49	24.87	25.01	24.92
		25	0	23.97	24.03	24.14
		25	13	23.93	23.94	24.08
		25	25	23.93	23.94	24.03
		50	0	23.93	23.98	24.11
	16QAM	1	0	23.84	24.54	24.14
		1	25	23.63	24.16	23.88
		1	49	23.67	24.24	23.67
		25	0	22.73	22.94	22.99
		25	13	22.70	22.92	22.93
		25	25	22.74	22.84	22.81
		50	0	22.70	22.93	22.87
	64QAM	1	0	23.13	23.28	23.33
		1	25	23.00	22.78	23.05
		1	49	23.07	22.89	22.76
		25	0	21.79	21.87	21.92
		25	13	21.77	21.82	21.93
		25	25	21.81	21.81	21.86
		50	0	21.75	21.82	21.86

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26115CH	26365CH	26615CH
				1857.5MHz	1882.5MHz	1907.5MHz
25 / 15M	QPSK	1	0	25.32	25.66	25.64
		1	38	24.66	24.97	25.03
		1	74	24.98	25.09	25.27
		36	0	24.07	24.10	24.16
		36	18	23.84	23.96	24.01
		36	39	23.79	23.99	24.03
		75	0	23.91	24.07	24.03
	16QAM	1	0	24.11	24.84	24.96
		1	38	23.52	24.09	24.26
		1	74	23.83	24.23	24.46
		36	0	22.93	22.93	22.88
		36	18	22.71	22.79	22.87
		36	39	22.71	22.73	22.82
		75	0	22.73	22.88	22.94
	64QAM	1	0	23.45	23.49	23.83
		1	38	22.78	22.75	23.20
		1	74	23.08	22.93	23.44
		36	0	21.87	21.98	21.89
		36	18	21.68	21.86	21.80
		36	39	21.65	21.84	21.75
		75	0	21.71	21.89	21.94

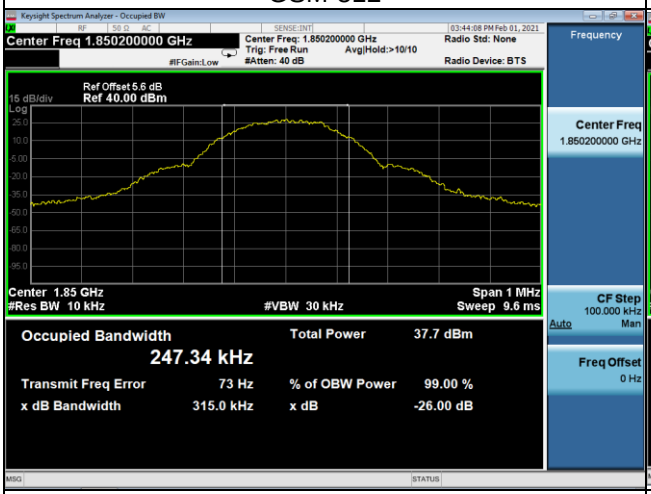
LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26140CH	26365CH	26590CH
				1860MHz	1882.5MHz	1905MHz
25 / 20M	QPSK	1	0	25.64	25.74	25.64
		1	50	24.78	24.82	24.68
		1	99	25.23	25.10	25.05
		50	0	24.20	24.17	23.99
		50	25	23.92	23.89	23.87
		50	50	24.02	23.97	23.95
		100	0	24.06	24.01	23.98
	16QAM	1	0	25.10	25.13	25.04
		1	50	24.16	24.13	24.04
		1	99	24.56	24.43	24.42
		50	0	22.95	23.04	22.92
		50	25	22.79	22.73	22.76
		50	50	22.82	22.88	22.77
		100	0	22.93	22.95	22.87
	64QAM	1	0	23.75	24.32	23.95
		1	50	22.81	23.32	22.99
		1	99	23.33	23.60	23.39
		50	0	21.95	21.99	22.06
		50	25	21.77	21.72	21.91
		50	50	21.80	21.80	21.96
		100	0	21.89	21.81	22.01

APPENDIX B - OCCUPIED BANDWIDTH

PCS1900					
GSM			EDGE		
CS			8PSK		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
512	1850.2	0.2473	512	1850.2	0.2473
661	1880	0.2431	661	1880	0.2427
810	1909.8	0.2473	810	1909.8	0.2451
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
512	1850.2	0.3150	512	1850.2	0.3237
661	1880	0.3160	661	1880	0.3111
810	1909.8	0.3248	810	1909.8	0.3176

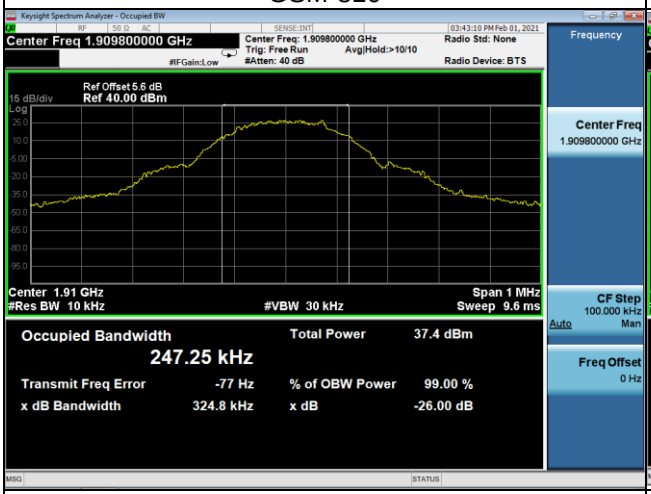
Spectrum Plot

GSM-512

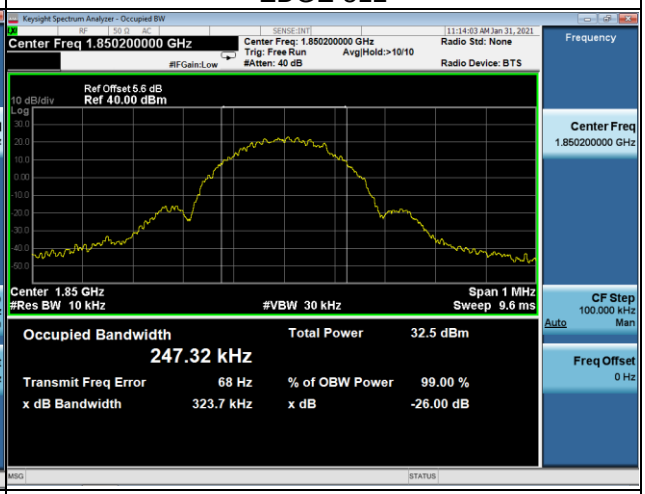


GSM-661

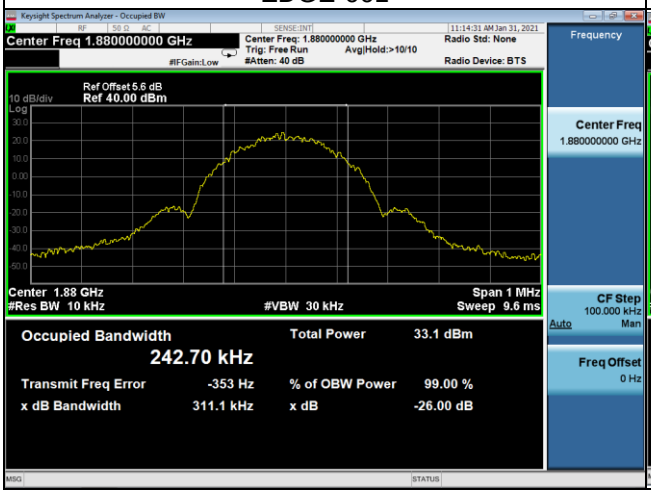
GSM-810



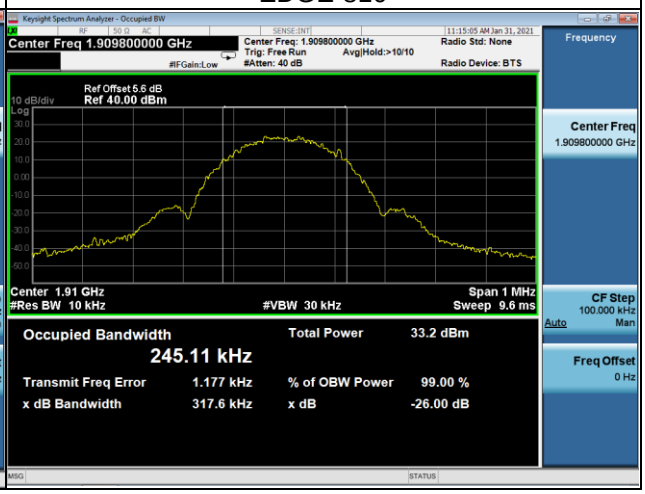
EDGE-512



EDGE-661



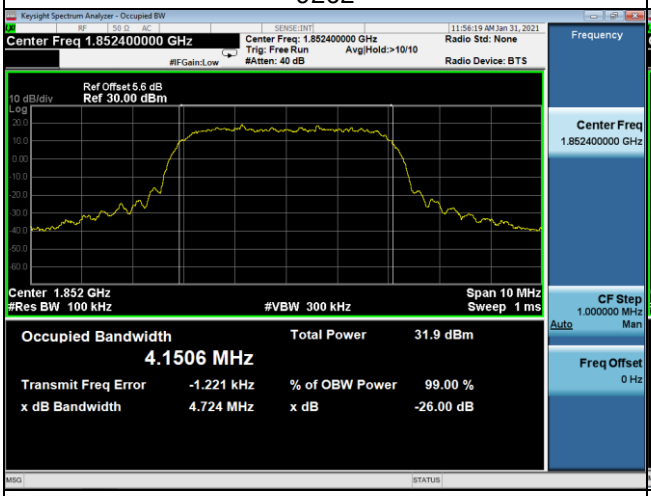
EDGE-810



WCDMA Band II_WCDMA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
9262	1852.4	4.1506	9262	1852.4	4.724
9400	1880	4.1485	9400	1880	4.731
9538	1907.6	4.1481	9538	1907.6	4.721

Spectrum Plot

9262



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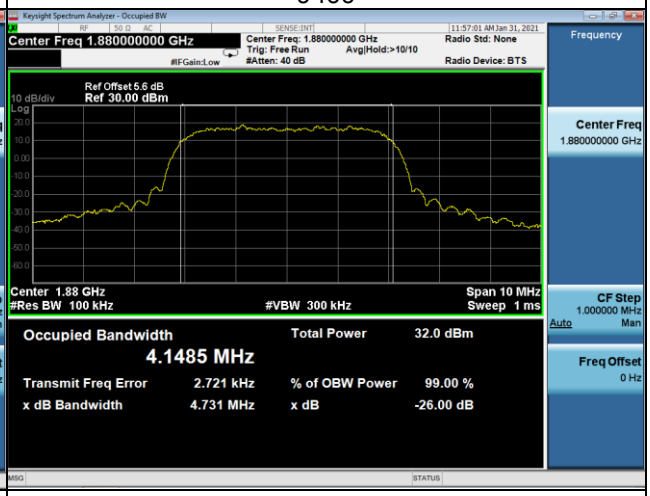

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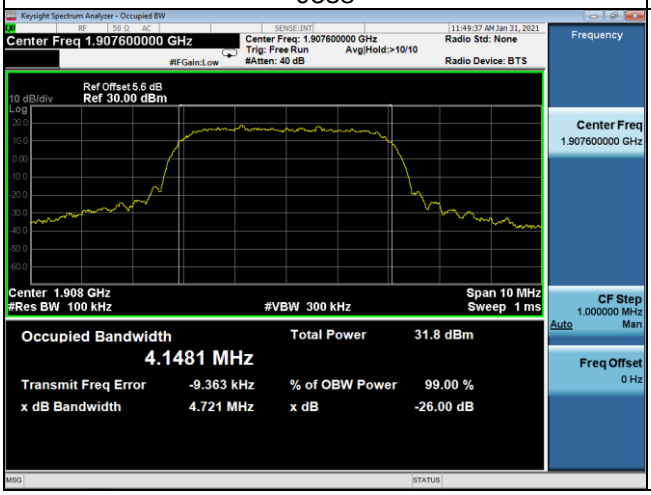

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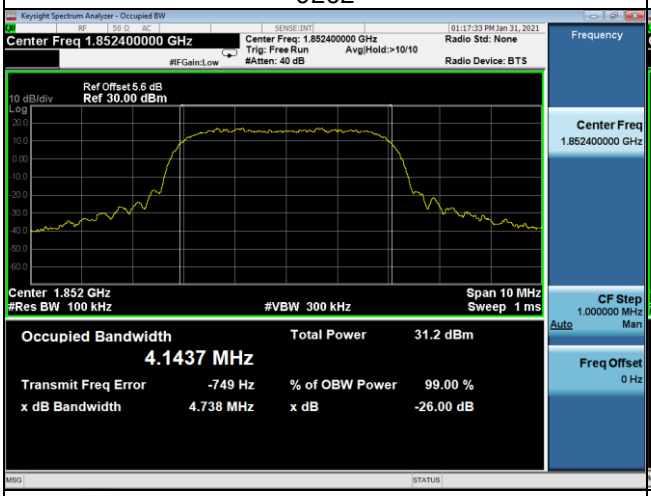
WCDMA Band II _HSDPA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
9262	1852.4	4.1437	9262	1852.4	4.738
9400	1880	4.1473	9400	1880	4.735
9538	1907.6	4.1380	9538	1907.6	4.726

Spectrum Plot

9262



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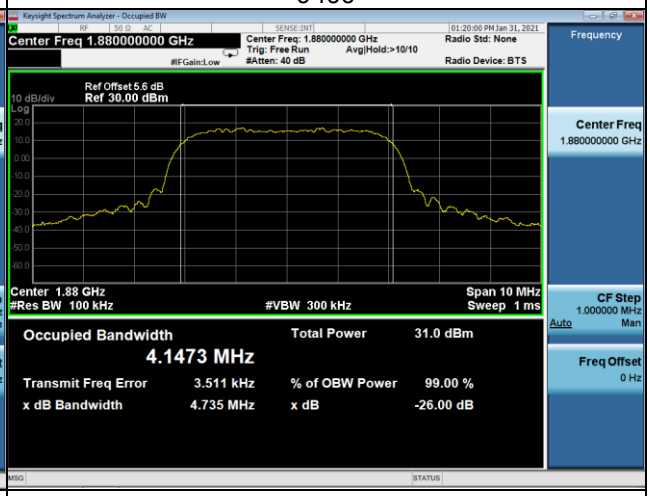

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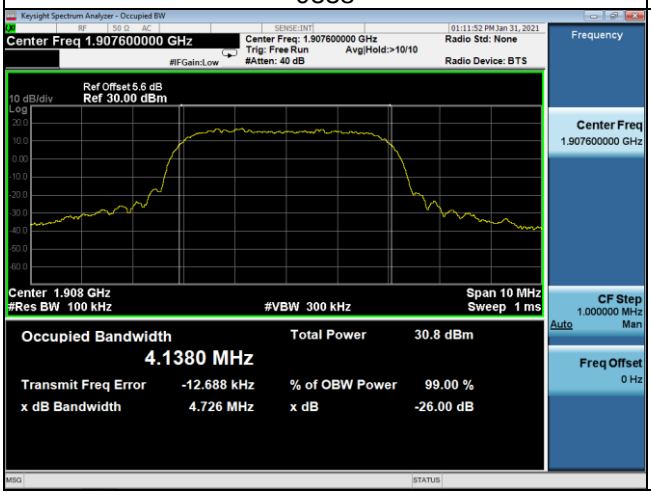

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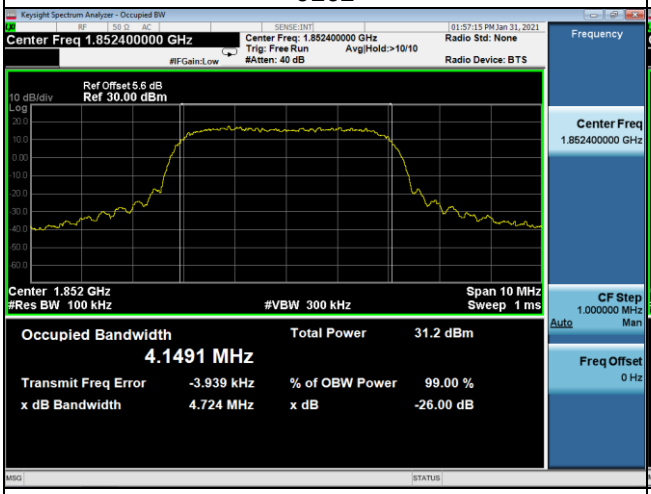
WCDMA Band II _HSUPA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
9262	1852.4	4.1491	9262	1852.4	4.724
9400	1880	4.1511	9400	1880	4.739
9538	1907.6	4.1508	9538	1907.6	4.738

Spectrum Plot

9262



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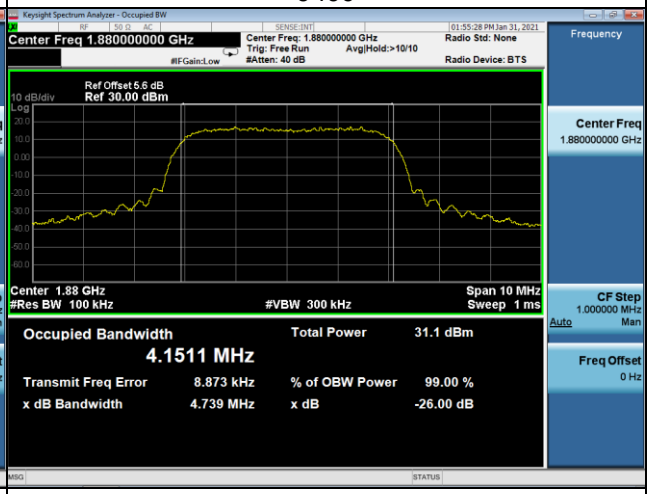

9538

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LTE Band 2_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18607	1850.7	1.0899	18607	1850.7	1.223
18900	1880	1.0981	18900	1880	1.232
19193	1909.3	1.0838	19193	1909.3	1.234
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18607	1850.7	1.0836	18607	1850.7	1.234
18900	1880	1.0890	18900	1880	1.234
19193	1909.3	1.0898	19193	1909.3	1.222
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18607	1850.7	1.0844	18607	1850.7	1.219
18900	1880	1.0866	18900	1880	1.241
19193	1909.3	1.0834	19193	1909.3	1.229