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FCC LTE REPORT

Certification

Applicant Name:		Date of Issue:
SAMSUNG Electronics Co., L	td.	August 25, 2020
		Location:
Address:		HCT CO., LTD.,
129, Samsung-ro, Yeongtong-	-gu,	74, Seoicheon-ro 578beon-gil, Majang-myeon,
Suwon-si, Gyeonggi-do, 1667	7, Rep. of Korea	Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
		Report No.: HCT-RF-2008-FC045
FCC ID:	A3LSMG781V	

A3LSMG781V

APPLICANT:

SAMSUNG Electronics Co., Ltd.

Model(s):	SM-G781V
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2

		Emission Designator		ERP		
Mode	Tx Frequency (MHz)		Modulation	Max. Power	Max. Power	
(MHz)				(W)	(dBm)	
LTE – Band13 (5)	779.5 –784.5	4M51G7D	QPSK	0.139	21.43	
		4M48W7D	16QAM	0.117	20.70	
		4M50W7D	64QAM	0.093	19.69	
		8M96G7D	QPSK	0.141	21.50	
LTE – Band13 (10)	782.0	8M94W7D	16QAM	0.120	20.81	
		8M96W7D	64QAM	0.078	18.91	

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



REVIEWED BY

Report prepared by : Jae Ryang Do Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *. The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.



<u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2008-FC045	August 25, 2020	- First Approval Report

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.



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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMG781V
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2
EUT Type:	Mobile Phone
Model(s):	SM-G781V
Tx Frequency:	779.5 MHz –784.5 MHz (LTE – Band 13 (5MHz)) 782 MHz (LTE – Band 13 (10 MHz))
Date(s) of Tests:	July 06, 2020 ~ August 12, 2020

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS, CDMA(BC0, 1, 10) and LTE, Sub6. It also supports IEEE 802.11 a/b/g/n/ac/ax (HT20/40/80), Bluetooth, BT LE, NFC, WPT, mmWave(n260/261).

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74**, **Seoicheon-ro 578beon-gil**, **Majang-myeon**, **Icheon-si**, **Gyeonggi-do**, **17383**, **Rep. of KOREA**.



3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3
	- ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0
	- ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna	- KDB 971168 D01 v03r01 – Section 6.0
Terminal	- ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8
Effective Isotropic Radiated Power	- ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2
	- ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-E-2016 Clause 2.2.17.

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power"

measurement capability for signals with continuous operation.

- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW \ge 3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points > 2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

Test Note

- 1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
- 2. A half wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The power is calculated by the following formula;

 $P_{d(dBm)} = Pg_{(dBm)} - cable loss_{(dB)} + antenna gain_{(dB)}$

Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference

between the gain of the horn and an isotropic antenna are taken into consideration

- 4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- 5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW ≥ 3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = Peak
- 6. Trace mode = Max Hold
- 7. The trace was allowed to stabilize
- 8. Test channel : Low/ Middle/ High
- 9. Frequency range : We are performed all frequency to 10th harmonics from 9 kHz.

Test Note

- Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data
- 3. For spurious emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The spurious emissions is calculated by the following formula;

 $\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss }_{(dB)} + \text{antenna gain }_{(dBi)}$

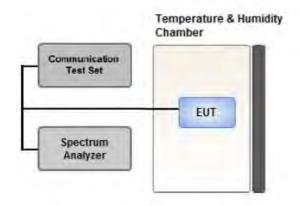
Where: P_g is the generator output power into the substitution antenna.

If the fundalmatal frequency is below 1GHz, RF output power has been converted to EIRP.

 $EIRP_{(dBm)} = ERP_{(dBm)} + 2.15$



3.4 OCCUPIED BANDWIDTH.



Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

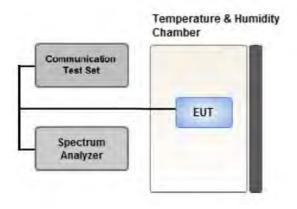
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW \geq 3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within
 - 1-5% of the 99% occupied bandwidth observed in Step 7



3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



<u>Test setup</u>

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

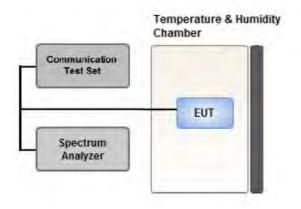
All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

- 1. RBW = 1 MHz
- 2. VBW ≥ 3 MHz
- 3. Detector = RMS
- 4. Trace Mode = trace average
- 5. Sweep time = auto
- 6. Number of points in sweep $\ge 2 \times \text{Span} / \text{RBW}$



3.6 BAND EDGE



Test setup

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1% of the emission bandwidth
- 4. VBW > 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points \geq 2 x Span/RBW
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

Test Notes

According to FCC 22.917, 24.238, 27.53 specified that 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

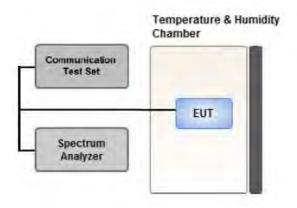
the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

All measurements were done at 2 channels(low and high operational frequency range.)

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.



3.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

The temperature is varied from -30°C to +50°C in 10°C increments using an

environmental chamber.

- 2. Primary Supply Voltage:
 - .- Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value

for other than hand carried battery equipment.

.- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature

(20°C to provide a reference).

- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.8 WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
- The worst case is reported with the EUT positioning, modulations, RB sizes and offsets,

and channel bandwidth configurations shown in the test data.

- Please refer to the table below.

[Webcedge]					
Test Description	Modulation	RB size	RB offset	Axis	
	QPSK,				
Effective Isotropic Radiated Power	16QAM,	1	0	Х	
	64QAM				
Radiated Spurious and Harmonic Emissions	QPSK	1	0	Y	

[Worst case]



3.9 WORST CASE(CONDUCTED TEST)

- Worst case : Of all modulation, We have tested modulation of the high Conducted Output Power.

Conducted Output Power value can be confirmed on the SAR report.

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset	
Occupied Bandwidth	QPSK, 16QAM, 64QAM	5, 10	Mid	Full RB	0	
		5 (10	Low	1	0	
	QPSK		High	1	24	
Band Edge			Low	1	0	
Dand Luge			High	1	49	
		5, 10	Low,	Full RB	0	
		5, 10	High	TUITE	0	
Spurious and Harmonic Emissions at			Low,			
Antenna Terminal	QPSK	5, 10	Mid,	1	0	
			High			

[Worst case]



4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibrati on Interval	Calibration Due
T&M SYSTEM	FBSR-02B(WHK1.2/15G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
WAINWRIGHT INSTRUMENT	WHNX6.0/26.5G-6SS/H.P.F	1	03/19/2020	Annual	03/19/2021
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
Hewlett Packard	E3632A/DC Power Supply	MY4004427	09/27/2019	Annual	09/27/2020
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93008124	03/18/2020	Annual	03/18/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	04/27/2020	Annual	04/27/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2020	Annual	06/04/2021
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/14/2019	Annual	10/14/2020
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/27/2019	Annual	08/27/2020
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	04/26/2019	Biennial	04/26/2021
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/12/2019	Biennial	03/12/2021
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/22/2020	Annual	01/22/2021
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
KEYSIGHT	E7515B / 5G Wireless Tester	MY58300756	01/07/2020	Annual	01/07/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/04/2020	Annual	06/04/2021
Mini-Circuits	ZC4PD-K1844+ / 4-Way Divider	942907	09/05/2019	Annual	09/05/2020
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

Note:

- 1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
- 2. Espectially, all antenna for measurement is calibrated in accordance with the requirements of C63.5

(Version : 2017).

5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05



6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §27.53(c)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
On all frequencies between 763- 775 MHz and 793-805 MHz.	§27.53(c)(4)	< 65 + 10log10 (P[Watts])	PASS <u>(See Note3)</u>
Conducted Output Power	§2.1046	N/A	See Note1
Frequency stability / variation of ambient temperature	§2.1055, § 27.54	Emission must remain in band	PASS

Note:

- 1. See SAR Report
- 2. The same samples were used for SAR and EMC
- Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance.

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result	
Effective Radiated Power	§27.50(b)(10)	< 3 Watts max. ERP	PASS	
Radiated Spurious and Harmonic	§2.1053,	< 43 + 10log10 (P[Watts]) for	PASS	
Emissions	§27.53(g)	all out-of band emissions	PASS	
Undesirable Emissions in	80 1052 07 52(f)	< -70dBW/MHz EIRP (wideband)	PASS	
the 1559 – 1610 MHz band	§2.1053, 27.53(f)	< -80dBW EIRP (narrowband)	FASS	



7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch	Ch./ Freq. Meas		Measured Substitute Ant. Ga		C.L	Pol.	ERP	
channel	Freq.(MHz)	Level(dBm)	Level(dBm)	(dBd)	U.L	P01.	w	dBm
128	824.20	-21.37	38.40	-10.61	0.95	Н	0.483	26.84

ERP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test, the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./ Freq.		Measured	Substitute	Ant. Gain	<u> </u>	Del	EII	RP
channel	Freq.(MHz)	Level(dBm)	Level(dBm)	(dBi)	C.L	Pol.	w	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	Н	0.456	26.59

EIRP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test, the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.



7.3. Emission Designator

<u>GSM</u>	Emission	Designator
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Emission Designator = 249KGXW GSM BW = 249 kHz G = Phase Modulation X = Cases not otherwise covered W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W GSM BW = 249 kHz G = Phase Modulation 7 = Quantized/Digital Info W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

- F = Frequency Modulation
- 9 = Composite Digital Info
- W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D LTE BW = 4.48 MHz G = Phase Modulation 7 = Quantized/Digital Info D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D LTE BW = 4.48 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission; telemetry; telecommand



8. TEST DATA

8.1 EFFECTIVE RADIATED POWER

Freq	Mod	Modulation	Measured	Substitute	Ant.	C.L	Pol	Limit	EF	RP
(MHz)	(Bandwidth)		Level (dBm)	Level (dBm)	Gain(dBd)			w	w	dBm
		QPSK	-29.28	32.72	-10.08	1.36	Н		0.134	21.28
779.5		16-QAM	-30.01	31.99	-10.08	1.36	Н		0.114	20.55
		64-QAM	-31.97	30.03	-10.08	1.36	Н		0.072	18.59
		QPSK	-29.41	32.79	-10.09	1.36	Н		0.136	21.34
782.0	LTE B13 (5 MHz)	16-QAM	-30.06	32.14	-10.09	1.36	Н	< 3.00	0.117	20.69
	(0	64-QAM	-31.09	31.11	-10.09	1.36	Н		0.092	19.66
	784.5	QPSK	-29.44	32.88	-10.10	1.36	Н		0.139	21.43
784.5		16-QAM	-30.17	32.15	-10.10	1.36	Н		0.117	20.70
		64-QAM	-31.18	31.14	-10.10	1.36	Н		0.093	19.69

Freq	Mod	Modulation	Measured	Substitute	Ant.	C.L	Pol	Limit	EF	RP
(MHz) (E	(Bandwidth)		Level (dBm)	Level (dBm)	Gain(dBd)			w	W	dBm
	782.0 LTE B13	QPSK	-29.25	32.95	-10.09	1.36	Н		0.141	21.50
782.0		16-QAM	-29.94	32.26	-10.09	1.36	Н	< 3.00	0.120	20.81
	(10 10112)	64-QAM	-31.84	30.36	-10.09	1.36	Н		0.078	18.91



8.2 RADIATED SPURIOUS EMISSIONS

I MODE:	<u>LTE B13</u>			
MODULATION SIGNAL:	<u>5 MHz QPSK</u>			
DISTANCE:	<u>3 meters</u>			

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
	1,559.0	-56.06	8.93	-62.91	1.94	V	-55.92	-13.00
23205 (779.5)	2,338.5	-49.47	9.83	-51.69	2.41	Н	-44.27	-13.00
(110.0)	3,118.0	-51.83	11.15	-52.06	2.82	н	-43.73	-13.00
	1,564.0	-55.85	8.99	-62.86	1.94	V	-55.81	-13.00
23230 (782.0)	2,346.0	-49.22	9.87	-51.37	2.41	Н	-43.92	-13.00
()	3,128.0	-51.96	11.15	-52.41	2.81	V	-44.07	-13.00
	1,569.0	-55.67	9.05	-62.85	1.94	V	-55.74	-13.00
23255 (784.5)	2,353.5	-49.19	9.94	-51.32	2.41	V	-43.79	-13.00
()	3,138.0	-52.00	11.18	-51.98	2.82	Н	-43.62	-13.00



I MODE:	<u>LTE B13</u>				
MODULATION SIGNAL:	<u>10 MHz QPSK</u>				
DISTANCE:	<u>3 meters</u>				

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
	1,564.0	-55.56	8.99	-62.57	1.94	V	-55.52	-13.00
23230 (782.0)	2,346.0	-49.04	9.87	-51.19	2.41	Н	-43.74	-13.00
(782.0)	3,128.0	-51.82	11.15	-52.27	2.81	Н	-43.93	-13.00



1559 MHz ~ 1610 MHz BAND

OPERATING FREQUENCY:	<u>779.5 MHz, 782.0 MHz, 784.5 MHz</u>
MEASURED OUTPUT POWER:	<u>5 MHz QPSK</u>
DISTANCE:	<u>3 meters</u>
WIDEBAND EMISSION LIMIT:	<u>-80 dBW/ MHz (= -50 dBm/ MHz)</u>

Operating Frequency (MHz)	Measured Frequency (MHz)	EMISSION TYPE	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Margin (dB)
779.5	1603.52		-64.05	9.32	-72.78	1.98	Н	-65.44	15.44
782.0	1601.88	Narrow Band	-63.99	9.30	-72.70	1.98	Н	-65.38	15.38
784.5	1605.34		-63.89	9.35	-72.73	1.99	Н	-65.37	15.37

Note:

The lower narrowband limit was applied because the spurious emission was not found.

OPERATING FREQUENCY:	<u>782.0 MHz</u>
MEASURED OUTPUT POWER:	<u>10 MHz QPSK</u>
■ DISTANCE:	<u>3 meters</u>
WIDEBAND EMISSION LIMIT:	<u>-80 dBW/ MHz (= -50 dBm/ MHz)</u>

Operating Frequency (MHz)	Measured Frequency (MHz)	EMISSION TYPE	Measured Level (dBm)		Substitute Level (dBm)	C.L	Pol	Result (dBm)	Margin (dB)
782.0	1607.21	Narrow Band	-63.59	9.35	-72.53	1.99	Н	-65.17	15.17

Note:

The lower narrowband limit was applied because the spurious emission was not found.



8.3 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data(MHz)
			QPSK	25	0	4.5075
	5 MHz		16-QAM	25	0	4.4838
40		700.0	64-QAM	25	0	4.5009
13		782.0	QPSK	50	0	8.9594
	10 MHz	0 MHz	16-QAM	50	0	8.9431
			64-QAM	50	0	8.9625

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 33 ~ 38.

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
		779.5	3.7034	27.976	-67.061	-39.085	
13	5	782.0	3.7179	27.976	-67.514	-39.538	-13.00
15		784.5	3.7099	27.976	-67.235	-39.259	-13.00
	10	782.0	3.6955	27.976	-67.193	-39.217	

8.4 CONDUCTED SPURIOUS EMISSIONS

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 51 ~ 54.

2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0

3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)

4. Factor(dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20	30.131

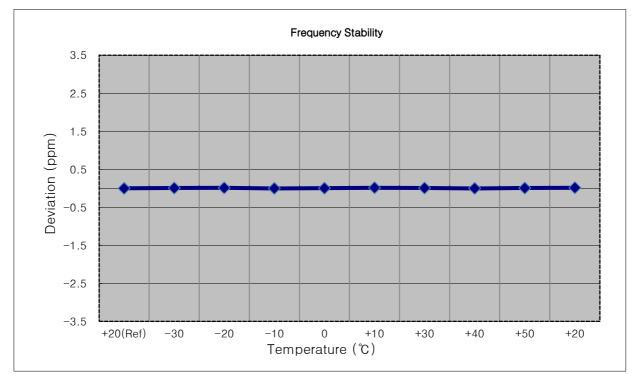
8.5 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 39 ~ 50.

8.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

I MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>779,500,000 Hz</u>
CHANNEL:	<u>23205 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.85 VDC</u>
DEVIATION LIMIT:	Emission must remain in band

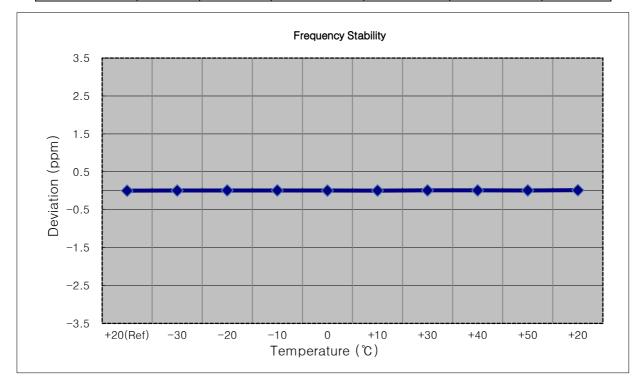
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	779 500 010	0.00	0.000 000	0.0000
100%		-30	779 500 016	6.10	0.000 001	0.0078
100%		-20	779 500 019	9.50	0.000 001	0.0122
100%		-10	779 500 007	-2.70	0.000 000	-0.0035
100%	3.850	0	779 500 013	2.90	0.000 000	0.0037
100%		+10	779 500 021	11.00	0.000 001	0.0141
100%		+30	779 500 015	5.50	0.000 001	0.0071
100%		+40	779 500 008	-2.00	0.000 000	-0.0026
100%		+50	779 500 016	6.10	0.000 001	0.0078
Batt. Endpoint	3.400	+20	779 500 020	10.60	0.000 001	0.0136





I MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>782,000,000 Hz</u>
CHANNEL:	<u>23230 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.85 VDC</u>
DEVIATION LIMIT:	Emission must remain in band

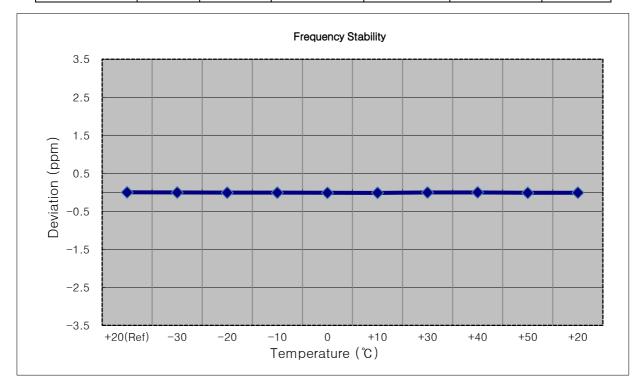
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	782 000 003	0.00	0.000 000	0.0000
100%		-30	782 000 007	4.50	0.000 001	0.0058
100%		-20	782 000 009	6.20	0.000 001	0.0079
100%		-10	782 000 009	6.00	0.000 001	0.0077
100%	3.850	0	782 000 006	3.50	0.000 000	0.0045
100%		+10	782 000 005	1.90	0.000 000	0.0024
100%		+30	782 000 010	7.40	0.000 001	0.0095
100%		+40	782 000 010	7.10	0.000 001	0.0091
100%		+50	782 000 008	5.10	0.000 001	0.0065
Batt. Endpoint	3.400	+20	782 000 012	9.60	0.000 001	0.0123





MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>784,500,000 Hz</u>
CHANNEL:	<u>23255 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.85 VDC</u>
DEVIATION LIMIT:	Emission must remain in band

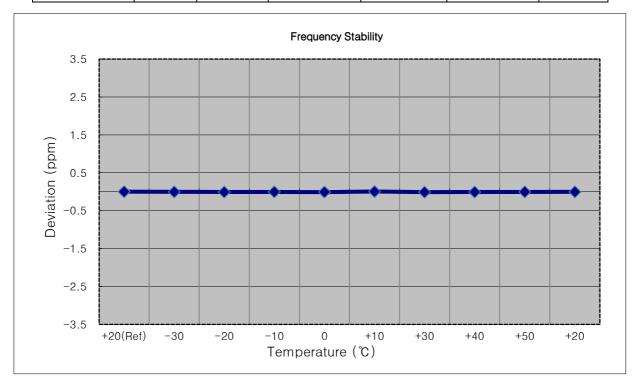
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	784 500 008	0.00	0.000 000	0.0000
100%		-30	784 500 004	-3.80	0.000 000	-0.0048
100%		-20	784 500 001	-7.70	-0.000 001	-0.0098
100%		-10	784 500 001	-7.50	-0.000 001	-0.0096
100%	3.850	0	784 499 998	-10.60	-0.000 001	-0.0135
100%		+10	784 499 997	-11.50	-0.000 001	-0.0147
100%		+30	784 500 004	-3.90	0.000 000	-0.0050
100%		+40	784 500 005	-2.80	0.000 000	-0.0036
100%		+50	784 499 998	-10.40	-0.000 001	-0.0133
Batt. Endpoint	3.400	+20	784 499 999	-9.30	-0.000 001	-0.0119





MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>782,000,000 Hz</u>
CHANNEL:	<u>23230 (10 MHz)</u>
REFERENCE VOLTAGE:	<u>3.85 VDC</u>
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation		
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm	
100%		+20(Ref)	781 999 998	0.00	0.000 000	0.0000	
100%		-30	781 999 995	-3.40	0.000 000	-0.0043	
100%	-	-20	781 999 993	-5.40	-0.000 001	-0.0069	
100%		-10	781 999 994	-3.70	0.000 000	-0.0047	
100%	3.850	0	781 999 991	-7.10	-0.000 001	-0.0091	
100%		+10	782 000 002	3.60	0.000 000	0.0046	
100%		+30	781 999 988	-9.70	-0.000 001	-0.0124	
100%		+40	781 999 991	-6.60	-0.000 001	-0.0084	
100%		+50	781 999 993	-4.90	-0.000 001	-0.0063	
Batt. Endpoint	3.400	+20	781 999 995	-2.60	0.000 000	-0.0033	





FCC ID: A3LSMG781V

9. TEST PLOTS



		rum Analyzer - C	•											
LXI RI	-	RF 50 eq 782.0	Ω AC				NSE:INT reg: 782.000	000 MHz	ALIC	SN AUTO	01:11:58 Radio Std	PM Jul 28, 2020	Fr	equency
PAS		eq 762.0			⊶	Trig: Fre	e Run	Avg Ho	ld: 50	0/500				
PAS				#IFGain:	low	#Atten: 2	20 dB				Radio Dev	ice: BTS		
10 dB	3/div		et 26.2 dB .00 dBm											
Log 30.0													c	enter Freq
20.0														.000000 MHz
10.0				man	~~~~	~~^^^	ᠰᡢᢇᡐᠬᢪᠰ	- Summer	ᠬᢇᢇᢧ᠕					
0.00			/							\ \				
-10.0			/							1				
-20.0											л			
-30.0 y	ᡙᠰᢦᠬᡁᠰ	mm	m ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~							\mathcal{V}	www.	wrymme yr		
-40.0				<u> </u>										
-50.0				<u> </u>										CF Step
														.000000 MHz
	ter 78: s BW	2 MHz 100 kHz				#VI	BW 390 H	Hz				n 10 MHz ep 1 ms	<u>Auto</u>	Man
0	ccup	ied Ban	dwidth				Total P	ower		32.1	dBm			Freq Offset
	ooup	lou Bull			MH	Z								0 Hz
Т	ransm	it Freq E	rror	22.	504 kl	Hz	OBW P	ower		99	.00 %			
x	dB Ba	ndwidth		4.9)22 MI	Hz	x dB			-26.	00 dB			
MSG									0	STATUS				

BAND 13. Occupied Bandwidth Plot (Ch.23230 QPSK RB 25) 5 MHz



	um Analyzer - Occupied BW							
Center Fre	RF 50 Ω AC eq 782.000000	MHz	SENSE:INT Center Freq: 782.	000000 MHz	ALIGN AUTO	01:11:43 PM Radio Std: N	1 Jul 28, 2020 Ione	Frequency
PASS		++ #IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold	1: 500/500	Radio Devic	e: BTS	
	Ref Offset 26.2 dB	3						
10 dB/div Log	Ref 40.00 dBm							
30.0								Center Freq
20.0								782.000000 MHz
10.0		monto	www.	Mann	stan y			
0.00		/						
-10.0								
-20.0	/							
-30.0 <mark>~~~~~</mark>	man my my					mm	www.www	
-40.0								
-50.0								CF Step
Conton 70							40 8411-	1.000000 MHz
Center 782 #Res BW			#VBW 39	0 kHz		Span Swee	10 MHz p 1 ms	<u>Auto</u> Man
Occup	ied Bandwidt	h	Tota	Power	31.0	dBm		Freq Offset
Occup		 4838 MI						0 Hz
	it Freq Error	18.432		Power	99	.00 %		
x dB Ba	ndwidth	4.944 N	/Hz x dB		-26.	00 dB		
MSG						3		

BAND 13. Occupied Bandwidth Plot (Ch.23230 16-QAM RB 25) 5 MHz



		n Analyzer - Occu												
LXI RL Cent	-	RF 50 Ω 782.000	AC 0000	Hz	С		E:INT q: 782.000	000 MHz	ALI	GN AUTO	06:34:25 P Radio Std	M Aug 03, 2020	Fre	equency
PAS		91021000		#IFGain:L		rig: Free Atten: 20		Avg Ho	ld: 50	0/500	Radio Dev	ice: BTS		
10 dE	3/div	Ref Offset Ref 40.0												
Log 30.0														enter Freq
20.0				mm	, mar have	᠁ᠬ	n	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-mary				102	
0.00			ļ							\ \ \				
-10.0			<u>ار</u>											
-20.0	. a.Mr.m/W	and all and and and	r.								m	hand		
-40.0	~1 ^{01 **0} 0 * 1													
-50.0													1	CF Step
	ter 782 s BW 10					#VB\	N 390 k	Hz				n 10 MHz ep 1 ms		Man
0	ccupie	ed Band	width				Total P	ower		30.0	dBm		F	req Offset
	4.5009 MHz										0 Hz			
Tr	ansmit	Freq Err	or	10.2	285 kHz	(OBW P	ower		99	.00 %			
X	dB Ban	dwidth		4.9	88 MHz		k dB			-26.	00 dB			
MSG									1	STATUS				

BAND 13. Occupied Bandwidth Plot (Ch.23230 64-QAM RB 25) 5 MHz



Magilent Spectrum Analyzer - Occupied BW					
ເ₩ RL RF 50Ω AC Center Freq 782.000000 MH	Lz Cent	SENSE:INT ter Freq: 782.000000 MHz	ALIGN AUTO	01:16:36 PM Jul 28, 2020 Radio Std: None	Frequency
BACC	Trig		old: 500/500	Radio Device: BTS	
#	IFGain:Low #Att	en: 20 dB		Radio Device: B13	
Ref Offset 26.2 dB 10 dB/div Ref 40.00 dBm					
10 dB/div Ref 40.00 dBm					
30.0					Center Freq
20.0					782.000000 MHz
10.0	an margaret and the	month to wall par again	wrowny		
			l,		
0.00					
-10.0					
-20.0				un man from a fine of the second s	
-30.0				" " " " " " " " " " " " " " " " " " "	
-40.0					
warden there of a prover and the					
-50.0					CF Step
Center 782 MHz				Span 20 MHz	2.000000 MHz Auto Man
#Res BW 200 kHz		#VBW 820 kHz		Sweep 1 ms	
Occupied Bandwidth		Total Power	32.0	dBm	Freq Offset
	594 MHz		02.0	d Bill	0 Hz
8.9					
Transmit Freq Error	28.102 kHz	OBW Power	99	.00 %	
x dB Bandwidth	9.723 MHz	x dB	x dB -26.		
			20.0		
MSG					

BAND 13. Occupied Bandwidth Plot (Ch.23230 QPSK RB 50) 10 MHz



🊺 Ag	ilent Spectrur	m Analyzer - Oco	cupied BW									
LXI RI	-	RF 50 Ω q 782.00	2 AC	U-,	Cen	SENSE:INT ter Freg: 782.0	00000 MHz	ALIGN	AUTO	01:16:21 Radio Std:	PM Jul 28, 2020	Frequency
PAS		q 782.00			🛶 Trig	: Free Run	Avg Hol	d: 500/	500			
FAS				#IFGain:Lo	ow #At	ten: 20 dB				Radio Dev	ce: BTS	
10 dB	3/div	Ref Offse Ref 40.0										
Log 30.0												Center Freq
20.0												782.000000 MHz
10.0				mann	n Manathan	ᢦᠬ ^ᡊ ᡎᡘᡎᡗᢦᠰᡁ᠕ᠵ᠋᠆ᡟᠬ	www.wallan	m				
0.00												
-10.0			لر						\			
-20.0			/						<u>۱</u>			
-30.0			mad						har to	-grandler and	mohrowing	
-40.0		/	r ^e									
-50.0	ᡣᡅᠬᡁᢦᢛᡮᡘᠾᡨ᠋ᢢᡁᢇ	and the second second second										
-30.0												CF Step 2.000000 MHz
	ter 782			.						Spa	n 20 MHz	
#Re	s BW 2	00 kHz				#VBW 820	kHz			Swe	ep 1 ms	
0	ccupi	ed Band	dwidth			Total	Power		31.0	dBm		Freq Offset
					MHz							0 Hz
Т	ransmi	t Freq Er	ror	30.8	07 kHz	OBW	Power		99	.00 %		
x	dB Bar	ndwidth		9.7	60 MHz	x dB			-26.0)0 dB		
MSG								Ū,	STATUS			

BAND 13. Occupied Bandwidth Plot (Ch.23230 16-QAM RB 50) 10 MHz



	•	m Analyzer - Oco	cupied BW									
LXI RL		RF 50 Ω q 782.00		47	Cer	SENSE:INT	000000 MHz	ALIG	N AUTO	06:35:51 P	M Aug 03, 2020	Frequency
PAS		q 702.00		#IFGain:L	Trig	g: Free Run ten: 20 dB	Avg He	old: 500)/500	Radio Dev	ice: BTS	
10 dE	3/div	Ref Offse Ref 40.0										
Log 30.0												Center Free 782.000000 MH
20.0				rannon	Jur Margan	WUMBYRM	^ղ աԴւ _տ ուտում է հե	~~~~~				
0.00								}	}			
-10.0									<u>\</u>			
-20.0 - -30.0 -			Mr						h	man Andrew	handleral worked	
-40.0	n Al Marsa ma	an Promonent										
-50.0												CF Step 2.000000 MH
	ter 782 s BW 20					#VBW 82	0 kHz				n 20 MHz ep 1 ms	<u>Auto</u> Mar
0	ccupie	ed Band			MHz	Tota	Power		29.9	dBm		Freq Offse 0 H:
Tr	ransmi	t Freq Er			253 kHz	OBW	Power		99	.00 %		
		ndwidth			89 MHz	x dB				00 dB		
MSG								Ц	STATUS			

BAND 13. Occupied Bandwidth Plot (Ch.23230 64-QAM RB 50) 10 MHz



	ctrum Analyzer - Swept SA							
IXI RL	RF 50 Ω AC req 776.000000 M		NSE:INT	#Avg Type	RMS		M Jul 28, 2020	Frequency
Center F		PNO: Wide ↔ Trig: Free IFGain:Low #Atten: 2	e Run			TYP DE		
10 dB/div Log	Ref Offset 26.2 dB Ref 26.20 dBm				Mki	1 776.0 -37.60	00 MHz 00 dBm	Auto Tune
16.2				\square				Center Freq 776.000000 MHz
6.20 -3.80								Start Freq 772.000000 MHz
-13.8							-13.00 dBm	Stop Freq 780.000000 MHz
-33.8			1-					CF Step 800.000 kHz <u>Auto</u> Man
-43.8						have a second	RMS	Freq Offset 0 Hz
-63.8						0	000 881	
Center 77 #Res BW	′6.000 MHz 100 kHz	#VBW 300 kHz			#Sweep	Span 8. 1.000 s ('	000 MHZ 1001 pts)	
MSG								

Band 13 Lower Band Edge Plot (5M BW Ch.23205 QPSK_RB1 OFFSET_0)



		rum Analyzer	•							
LXI RI Cen		^{RF} ea 776	50 Ω AC	MHz		ISE:INT	#Avg Typ	ALIGN AUTO	01:10:05 PM Jul 28, 20 TRACE 1 2 3 4	5 6 Frequency
				PNO: Wide ↔→ IFGain:Low	Trig: Free #Atten: 20					
10 dE	3/div		et 26.2 dB 20 dBm					Mk	r1 776.000 MH -38.749 dB	z Auto Tune
-										Center Freq
16.2									F	776.000000 MHz
6.20										Start Freq
-3.80										772.000000 MHz
-13.8									-13.00 c	Stop Freq
-23.8										780.000000 MHz
-33.8						.1				CF Step
-43.8										800.000 kHz <u>Auto</u> Man
										Freq Offset
-53.8				and a second						0 Hz
-63.8										
		6.000 M							Span 8.000 Mł	Hz
	s BW	100 kHz		#VBW	300 kHz				1.000 s (1001 pt	ts)
MSG										

Band 13 Lower Band Edge Plot (5M BW Ch.23205 QPSK_RB_25)



	ilent Spectrum Analyzer - Swept SA					
<mark>IXI</mark> RI Cent	L RF 50 Ω AC	MHz		ALIGN AUTO #Avg Type: RMS	01:10:24 PM Jul 28, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
		PNO: Wide ↔ Trig: Free IFGain:Low #Atten: 20				
10 dE Log r	Ref Offset 26.2 dB 3/div Ref -10.00 dBm			Mkı	1 774.976 MHz -64.128 dBm	Auto Tune
LUg						Center Freq
-20.0						769.000000 MHz
-30.0						
-40.0					-35.00 dBm	Start Freq 763.000000 MHz
-40.0						
-50.0						Stop Freq
-60.0					1	775.000000 MHz
-70.0	กก <i>ารอยู่สามมีของการสถุการกระการส</i> มสาย มาโมน	๖๓ๅๅ๛ฅ๖๛๚๚๚๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	น	าสูลใบการสุด _ส ารไปก _{ระส} ารให้เรารูปประชาญการไปประว	run. 	CF Step
-70.0						1.200000 MHz <u>Auto</u> Man
-80.0						
-90.0						Freq Offset 0 Hz
100						0 H2
-100						
	t 763.000 MHz				Stop 775.000 MHz	
	s BW 10 kHz	#VBW 30 kHz		#Sweep	1.000 s (1001 pts)	
MSG				I STATUS		

Band 13 Lower Emission Mask (763 MHz ~ 775 MHz) Plot (5M BW Ch.23205 QPSK_RB25_0)



	it Spectrum Analyzer - Swept SA					
LXI RL	RF 50 Ω AC		E:INT #Avg Type	ALIGN AUTO	01:15:57 PM Jul 28, 2020 TRACE 1 2 3 4 5 6	Frequency
Cente	er Freq 776.000000 N	PNO: Wide ↔ Trig: Free F IFGain:Low #Atten: 20	Run			
10 dB/d Log	Ref Offset 26.2 dB liv Ref 26.20 dBm			Mkr1	776.000 MHz -52.120 dBm	Auto Tune
16.2 —						Center Freq 776.000000 MHz
6.20 — -3.80 —						Start Freq 772.000000 MHz
-13.8 =					-13.00 dBm	Stop Freq 780.000000 MHz
-33.8 —			\sim			CF Step 800.000 kHz <u>Auto</u> Man
-43.8			1		RMS	Freq Offset 0 Hz
-63.8						
	r 776.000 MHz BW 100 kHz	#VBW 300 kHz		#Sweep 1	Span 8.000 MHz .000 s (1001 pts)	
MSG				I STATUS		

Band 13 Lower Band Edge Plot (10M BW Ch.23230 QPSK_RB1 OFFSET_0)



🍺 Agilent Spectrum Analyzer - Swept	SA				
RL RF 50 Ω Center Freq 776.0000		SENSE:INT	ALIGN AUTO #Avg Type: RMS	01:15:11 PM Jul 28, 2020 TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB			Auto Tuno
Ref Offset 26.2 10 dB/div Ref 26.20 d Log	2 dB Bm		Mk	r1 775.984 MHz -38.322 dBm	Auto Tune
16.2					Center Freq 776.000000 MHz
-3.80				RMS	Start Freq 772.000000 MHz
-23.8				-13.00 dBm	Stop Freq 780.000000 MHz
-33.8		1			CF Step 800.000 kHz <u>Auto</u> Man
-63.8	hand a mart of the second s				Freq Offset 0 Hz
-63.8					
Center 776.000 MHz #Res BW 100 kHz	#VBW	300 kHz	#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG					

BAND 13. Lower Band Edge Plot (10M BW Ch.23230 QPSK RB_50)



	ctrum Analyzer - Swept SA					
Center F	RF 50 Ω AC req 769.000000	MHz	SENSE:INT	ALIGN AUTO #Avg Type: RMS	01:15:30 PM Jul 28, 2020 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide +++	Trig: Free Run #Atten: 20 dB			Auto Tuno
10 dB/div Log	Ref Offset 26.2 dB Ref -10.00 dBm	1		Mk	r1 774.664 MHz -64.258 dBm	Auto Tune
						Center Freq
-20.0						769.000000 MHz
-30.0					-35.00 dBm	Start Freq
-40.0						763.000000 MHz
-50.0						Oton From
						Stop Freq 775.000000 MHz
-60.0					MS	
-70.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	าประการสมุขสารารางการการการสารารา	Alerando a seconda de la se Nomena de la seconda de la s	૯ ૦૯ કુકે કે છે. છે. છે. છે. છે. છે. છે. છે.		CF Step 1.200000 MHz
-80.0						<u>Auto</u> Man
-90.0						Freq Offset
-50.0						0 Hz
-100						
Start 763	.000 MHz				Stop 775.000 MHz	
#Res BW		#VBW 3	0 kHz	#Sweep	1.000 s (1001 pts)	
MSG						

Band 13 Lower Emission Mask (763 MHz ~ 775 MHz) Plot (10M BW Ch.23230 QPSK_RB50_0)



	ctrum Analyzer - Swept SA						
LXIRL	RF 50 Ω AC		SENSE:INT	#Ava T	ALIGN AUTO	01:14:00 PM Jul 28, 2020 TRACE 1 2 3 4 5 6	Frequency
Center F	req 788.000000	PNO: Wide	Trig: Free Run #Atten: 20 dB	#Avg 1			
10 dB/div	Ref Offset 26.2 dB Ref 26.20 dBm				Mk	1 788.008 MHz -38.240 dBm	Auto Tune
16.2							Center Freq 788.000000 MHz
6.20 -3.80							Start Freq 784.000000 MHz
-13.8						-13.00 dBm	Stop Freq 792.000000 MHz
-33.8			1				CF Step 800.000 kHz <u>Auto</u> Man
-53.8						RMS	Freq Offset 0 Hz
-63.8	88.000 MHz					Enon & 000 Mills	
#Res BW		#VBW 3	300 kHz		#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG					I o STATUS		

Band 13 Upper Band Edge Plot (5M BW Ch.23255 QPSK_RB1_Offset 24)



	ctrum Analyzer - Swept SA					
Center F	RF 50 Ω AC req 788.000000	MHz	SENSE:INT	ALIGN AUTO #Avg Type: RMS	01:13:12 PM Jul 28, 2020 TRACE 1 2 3 4 5 6 TYPE A MARAAAAA	Frequency
	Ref Offset 26.2 dB	PNO: Wide ↔ IFGain:Low	#Atten: 20 dB	Mk	r1 788.000 MHz -38.174 dBm	
10 dB/div Log	Ref 26.20 dBm				-38.174 dBm	
16.2						Center Freq 788.000000 MHz
6.20	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
-3.80						Start Freq 784.000000 MHz
-13.8					-13.00 dBm	Stop Freq
-23.8						792.000000 MHz
-33.8			1			CF Step 800.000 kHz
-43.8		ب ري 		and a second and a second and a second and a second a s	RMS	<u>Auto</u> Man
						Freq Offset
-53.8 ———						0 Hz
-63.8						
Center 78 #Res BW	38.000 MHz 100 kHz	#VBW	300 kHz	#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG						

Band 13 Upper Band Edge Plot (5M BW Ch.23255 QPSK_RB_25)



	n Analyzer - Swept SA					
IXI RL	RF 50 Ω AC		SENSE:INT	ALIGN AUTO #Avg Type: RMS	01:13:33 PM Jul 28, 2020 TRACE 1 2 3 4 5 6	Frequency
	q 799.000000 N	PNO: Wide	Trig: Free Run Atten: 20 dB	#Avg Type. Allo		
R 10 dB/div R Log	tef Offset 26.2 dB tef -10.00 dBm			Mk	r1 793.000 MHz -63.360 dBm	Auto Tune
-20.0						Center Freq 799.000000 MHz
-30.0					-35.00 dBm	Start Freq 793.000000 MHz
-50.0 -60.0 <mark>1</mark>						Stop Freq 805.000000 MHz
-70.0	h dele hange han general date	instruction in a second s	el-of-the-briefenthationet	าร์ <mark>ครางปูร์กษาได้สถิญ ซึ่งกรุ่มหุรสิงสาวอยุกลุ</mark>	RMS สีกระกาะกุณกก-กระวรมปัจจุบันป	CF Step 1.200000 MHz <u>Auto</u> Man
-90.0						Freq Offset 0 Hz
Start 793.00		#VBW 3		#Swoon	Stop 805.000 MHz 1.000 s (1001 pts)	
MSG				#Sweep		

Band 13 Upper Emission Mask (793 MHz ~805 MHz) Plot (5M BW Ch.23255 QPSK_RB25_0)





Band 13 Upper Band Edge Plot (10M BW Ch.23230 QPSK_RB1_Offset_49)



	rum Analyzer - Swept SA					
LXI RL	RF 50 Ω AC		SENSE:INT	ALIGN AUTO #Avg Type: RMS	01:17:33 PM Jul 28, 2020	Frequency
Center Fr	eq 788.000000 N	PNO: Wide ↔→ IFGain:Low	Trig: Free Run #Atten: 20 dB		TRACE 1 2 3 4 5 6 TYPE A WWWW DET A A A A A A	
10 dB/div Log	Ref Offset 26.2 dB Ref 26.20 dBm			Mkı	1 788.048 MHz -33.481 dBm	Auto Tune
16.2						Center Freq 788.000000 MHz
-3.80						Start Freq 784.000000 MHz
-13.8					-13.00 dBm	Stop Freq 792.000000 MHz
-33.8			1	and the second	RMS	CF Step 800.000 kHz <u>Auto</u> Man
-53.8						Freq Offset 0 Hz
-63.8 Center 783 #Res BW 7		#VBW	300 kHz	#Sween	Span 8.000 MHz 1.000 s (1001 pts)	
MSG			000-1112			

Band 13 Upper Band Edge Plot (10M BW Ch.23230 QPSK_ QPSK_RB_50)



	nt Spectrum Analyzer	•								
LXI RL Cente	_R ⊧ er Freq 799.	50Ω AC	Hz	SENS	E:INT	#Avg Type	ALIGN AUTO E: RMS	TRACI	M Jul 28, 2020	Frequency
			PNO: Wide ↔ IFGain:Low	Trig: Free F #Atten: 20				TYP DE		
10 dB/c Log r	Ref Offse div Ref -10 .	t 26.2 dB . 00 dBm					Mkı	1 793.0 -56.08	00 MHz 32 dBm	Auto Tune
-20.0 —										Center Freq 799.000000 MHz
-30.0 — -40.0 —									-35.00 dBm	Start Freq 793.000000 MHz
-50.0 (1 -60.0	WWWWWWWWWWWWWWWWWWWWW									Stop Freq 805.000000 MHz
-70.0	and the second	and and the second states of t	Maryan and Shake and Angeler and Angel	ang dan kana kana kana kana kana kana kana	Los (yest and and yest	aliva-ugangganalival	๛ๅ๚๚๛๛๚	h-j-aktoragety	RMS โคนามประชุญณะเม	CF Step 1.200000 MHz <u>Auto</u> Man
-90.0 —										Freq Offset 0 Hz
	793.000 MHz							Stop 805.	000 MH <u>z</u>	
	BW 10 kHz		#VBW	30 kHz			#Sweep	1.000 s (*	1001 pts)	
MSG										

Band 13 Upper Emission Mask (793 MHz ~805 MHz) Plot (10M BW Ch.23230 QPSK_RB50_0)



	trum Analyze:										×
IXI RL	RF	50 Ω AC 15000000		SEN	SE:INT	#Ava Ti	ALIGN AUTO		PM Jul 28, 2020 E 1 2 3 4 5 6	Frequency	
Cerner F	led 9.0	15000000	PNO: Fast H	🕂 Trig: Free			,pe. raile	TYP			
			IFGain:Low	#Atten: 20	dB			-		Auto Tu	ne
							MI	kr1 3.70	3 4 GHz	Autoru	
10 dB/div Log		.00 dBm						-67.0	61 dBm		
0.00										Center Fr	ea
-10.0										5.015000000 G	- 1
-20.0											
-30.0											
										Start Fr	· · · ·
-40.0										30.000000 M	Hz
-50.0											
-60.0			\'						RMS	Stop Fr	ea
-70.0										10.000000000 G	- 1
-80.0											
Start 30 N	/비ァ							Stop 10	.000 GHz	CF St	on
#Res BW		Z	#VB\	N 3.0 MHz			Sweep 17	7.33 ms (2	0001 pts)	997.000000 M	
MKR MODE TF		X		Y	FUNC		UNCTION WIDTH		DN VALUE	<u>Auto</u> M	lan
1 N 1	f	3.	703 4 GHz	-67.061 dB	m		one non morn	- ONCH			
2 N 1 3	f		777.8 MHz	-3.149 dB	m					Freq Offs	set
4											Hz
5 6									E		
7 8											
9											
10											
				III					- • ·		
MSG								s			
						_					

BAND 13. Conducted Spurious Plot (23205ch_5MHz_QPSK_RB 1_0)



Center Freq 5.01500000 GHz PNO: Fast IFGain:Low Trig: Free Run #Atten: 20 dB Mkr1 3.717 9 GHz -67.514 dBm Center Freq 5.01500000 GHz -67.514 dBm Start Freq 30.0 -0.0		trum Analyzer - Swe	ept SA									
PNO: Fast → IFGain:Low Trig: Free Run #Atten: 20 dB Trig: AAAAAA Mkr1 3.717 9 GHz -67.514 dBm Center Freq 10 dB/div Ref 10.00 dBm -67.514 dBm -0.00 -20.0 -10.0 -10.0 -10.0 -30.0 -10.0 -10.0 -10.0 -10.0 -10.0 -10.0 -40.0 -10.0 -10.0 -10.0 -10.0 -10.0 -10.0 -10.0 -30.0 -10.0 -10.0 -10.0 -10.0 -10.0 -10.0 -10.0 -20.0 -10	IXI RL			217	SEN	SE:INT	#Ava Tvi				Frequenc	у
Inequine Inequine Mkr1 3.717 9 GHz -67.514 dBm Auto Tune 10 dB/div Ref 10.00 dBm -67.514 dBm Center Freq 10.0 -200 </td <td>Center II</td> <td>leq 5.0150</td> <td></td> <td>PNO: Fast ++</td> <td></td> <td></td> <td></td> <td></td> <td>TY</td> <td></td> <td></td> <td></td>	Center II	leq 5.0150		PNO: Fast ++					TY			
MKr1 3.717 9 GH2 -67.514 dBm Og -67.514 dBm Og -20				IFGain:Low	#Atten: 20	a B						Tune
Log 2 0.00 2 10.0 5.01500000 GHz 20.0 30.0 5.01500000 GHz 40.0 5.01500000 MHz 50.0 5.01500000 MHz 50.0 5.01500000 MHz 50.0 5.01500000 MHz		B - 6 - 6 0 0 0						IVI	-67 5	/ 9 GHZ 1/ dBm		
-10.0 -20.0 -30.0 -40.0 -50.0 -60.0 -60.0 			dBm						-07.0			
-20.0 -30.0	0.00	_ \^									Center	Freq
-30.0 -40.0 -60.0 -60.0	-10.0										5.01500000) GHz
-40.0 -50.0 -60.0	-20.0											
-40.0	-30.0										Start	From
-50.01	-40.0											
-60.0	-50.0											1111 12
End Stop Freq	-60.0			1								
	-70.0									RMS		
-60.0	and the state of the state										10.00000000) GHz
Start 30 MHz Stop 10.000 GHz CF Step				<i>//</i>) (5) 4					Stop 10	.000 GHz		
#Res BW 1.0 MHz				#VBM	1 3.U WHZ			sweep 1/	7.33 ms (2	0001 pts)		
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE Image: Control of the second sec				70 CH-			TION FU	INCTION WIDTH	FUNCTIO	ON VALUE		
2 N 1 f 780.7 MHz -3.021 dBm	2 N 1		78	0.7 MHz							Erog O	ffeat
											Frequ	0 Hz
										E		UTIL
	7											
					III					•		
	MSG								s			

BAND 13. Conducted Spurious Plot (23230ch_5MHz_QPSK_RB 1_0)



	trum Analyzer - Sv	wept SA								
LXIRL	RF 50			SEN	SE:INT	#Ava -	ALIGN AUTO Type: RMS		PM Jul 28, 2020 CE 1 2 3 4 5 6	Frequency
Center Fr	eq 5.0150	100000	GFIZ PNO: Fast ↔	🛏 Trig: Free		#Avg	Type. Kino	TY		
			IFGain:Low	#Atten: 20	dB			DI		
							M	kr1 3.70	9 9 GHz	Auto Tune
10 dB/div	Ref 10.00) dBm						-67.2	35 dBm	
Log	2									
0.00	Y-									Center Freq
-10.0										5.015000000 GHz
-20.0										
-30.0										Start Freq
-40.0										30.000000 MHz
-50.0										30.000000 WIFI2
-60.0			. 1	1						
									RMS	Stop Freq
-70.0				and the second designed to the second designe						10.00000000 GHz
-80.0										
Start 30 M								Stop 10	.000 GHz	CF Step
#Res BW			#VB	W 3.0 MHz			Sweep 1	3.00 10 7.33 ms (2	0001 pts)	997.000000 MHz
MKR MODE TR		×			E DIN	TION	-		ON VALUE	<u>Auto</u> Man
		×	709 9 GHz	Y -67.235 dB		CTION	FUNCTION WIDTH		UN VALUE	
2 N 1	f	7	787.2 MHz	-2.545 dB						Freq Offset
3										0 Hz
5									E	0 H2
6										
8										
9 10										
11									-	
•							_1		•	
MSG							I o stati	JS		

BAND 13. Conducted Spurious Plot (23255ch_5MHz_QPSK_ RB 1_0)



	trum Analyzer -	•								
LXI RL		0Ω AC		SEI	NSE:INT		ALIGN AUTO		PM Jul 28, 2020	Frequency
Center Fr	req 5.015	000000	PNO: Fast +	Trig: Fre		#Avg iy	pe: RMS	TYP	E 1 2 3 4 5 6 E A WWWW T A A A A A A	
			IFGain:Low	#Atten: 2	0 dB					Auto Tune
							Mk	r1 3.69	5 5 GHz	Autorune
10 dB/div Log	Ref 10.0	0 dBm						-67.1	93 dBm	
0.00										Center Freq
	ľ I									5.015000000 GHz
-10.0										5.015000000 GHZ
-20.0										
-30.0										Start Freq
-40.0										30.000000 MHz
-50.0										
-60.0				1						
-70.0							Helen - Hills Strategy and Strategy and		RMS	Stop Freq
-80.0										10.00000000 GHz
-80.0										
Start 30 N	/IHz	I	I		1			Stop 10	.000 GHz	CF Step
#Res BW			#VB	W 3.0 MHz		-	Sweep 17	.33 ms (2	0001 pts)	997.000000 MHz
MKR MODE TR	C SCL	X		Y	FUN	CTION FI	UNCTION WIDTH	FUNCTIO	DN VALUE	<u>Auto</u> Man
1 N 1	f	3.	695 5 GHz	-67.193 di	Bm					
2 N 1 3	f		778.2 MHz	-2.565 di	Bm					Freq Offset
4										0 Hz
5									=	
7										
8										
10										
11										
MSG								3		
							NonAloc			

BAND 13. Conducted Spurious Plot (Ch.23230 10 MHz QPSK RB 1, Offset 0)



10. APPENDIX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2008-FC045-P