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FCC LTE REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.		Date of Issue: July 16, 2021		
Address:		Location: HCT CO., LTD.,		
129, Samsung-ro, Yeongtong-gu,		74, Seoicheon-ro 578beon-gil, Majang-myeon,		
Suwon-si, Gyeonggi-do, 16677	, Rep. of Korea	Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA		
		Report No.: HCT-RF-2107-FC037		
FCC ID:	A3LSMG715U1			
APPLICANT:	SAMSUNG Electron	ics Co., Ltd.		

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMG715U report.

Model(s):	SM-G715U1
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2

				ERP	
Mode	Tx Frequency	Emission	Modulation	Max. Power	Max. Power
(MHz)	(MHz)	Designator		(W)	(dBm)
LTE – Band13 (5)	779.5 –784.5	4M52G7D	QPSK	0.154	21.88
		4M52W7D	16QAM	0.120	20.79
		4M51W7D	64QAM	0.095	19.78
LTE – Band13 (10)		9M02G7D	QPSK	0.160	22.05
	782.0	9M00W7D	16QAM	0.120	20.81
		8M99W7D	64QAM	0.097	19.87

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

4 mer.

Report prepared by : Jae Mun 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-2107-FC037	July 16, 2021	- 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:	A3LSMG715U1
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-G715U1
Tx Frequency:	779.5 MHz –784.5 MHz (LTE – Band 13 (5MHz)) 782 MHz (LTE – Band 13 (10 MHz))
Date(s) of Tests:	December 17, 2019 ~ January 08, 2020
Serial number:	Radiated: UEH1488S Conducted: UEH1480S



2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE. It also supports IEEE 802.11 a/b/g/n/ac (HT20/40/80), Bluetooth, BT LE, NFC, ANT+.

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 Sourious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2
Radiated Spurious and Harmonic Emissions	- 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.

ANSI/11A-003-E-2010

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;

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

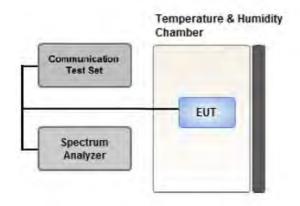
Where: P_{g} is the generator output power into the substitution antenna.

If the fundamental 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.

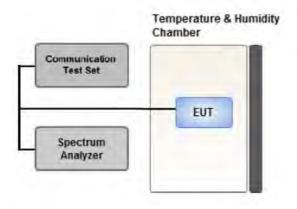
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

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



Test setup

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.

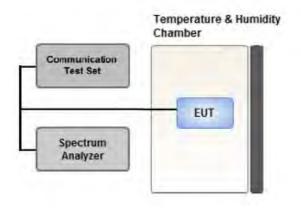
All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

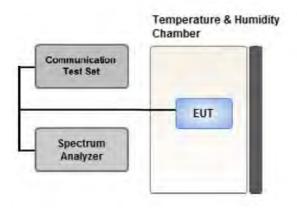
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a 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.

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



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.

[Worst case]

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



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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	-	03/02/2021	Annual	03/02/2022
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/02/2021	Annual	03/02/2022
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/07/2021	Annual	04/07/2022
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
Schwarzbeck	UHAP/ Dipole Antenna	557	04/05/2021	Biennial	04/05/2023
Schwarzbeck	UHAP/ Dipole Antenna	558	04/05/2021	Biennial	04/05/2023
ESPEC	SU-642 / Chamber	93008124	03/15/2021	Annual	03/15/2022
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	10/13/2020	Biennial	10/13/2022
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY50200093	11/17/2020	Annual	11/17/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/01/2021	Annual	06/01/2022
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/14/2020	Annual	10/14/2021
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/26/2020	Annual	08/26/2021
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-333	03/19/2020	Biennial	03/19/2022
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/03/2021	Biennial	03/03/2023
Schwarzbeck	VULB9168/ Hybrid Antenna	760	02/22/2021	Biennial	02/22/2023
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/07/2021	Annual	01/07/2022
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/05/2021	Annual	07/05/2022
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/02/2021	Annual	06/02/2022
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 Note2)</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
- 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	FAGG
Undesirable Emissions in	\$2,4052,07,52(f)	< -70dBW/MHz EIRP (wideband)	PASS
the 1559 – 1610 MHz band	§2.1053, 27.53(f)	< -80dBW EIRP (narrowband)	PA22



7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch	/ Freq.	Measured	Substitute	Ant. Gain	<u></u>	Pol.	EF	ERP	
channel	Freq.(MHz)	Level(dBm)	Level(dBm)	(dBd)	C.L P		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	C.L	Pol.		RP	
channel	Freq.(MHz)	Level(dBm)	Level(dBm)	(dBi)	U.L	POI.	w	dBm	
132322	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

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		Modulation	Measured	Substitute	Ant.	C.L Pol		Limit	EF	RP
(MHz)	(Bandwidth)		Level (dBm)	Level (dBm)	Gain(dBd)			w	w	dBm
		QPSK	-28.71	33.19	-10.08	1.24	Н		0.154	21.88
779.5		16-QAM	-29.80	32.10	-10.08	1.24	Н		0.120	20.79
		64-QAM	-30.86	31.04	-10.08	1.24	Н		0.094	19.73
		QPSK	-29.05	33.06	-10.09	1.24	Н		0.149	21.73
782.0	LTE B13 (5 MHz)	16-QAM	-30.05	32.06	-10.09	1.24	Н	< 3.00	0.118	20.73
	(0	64-QAM	-31.17	30.94	-10.09	1.24	Н		0.091	19.61
		QPSK	-29.16	33.14	-10.10	1.24	Н		0.151	21.80
784.5		16-QAM	-30.27	32.03	-10.10	1.24	Н		0.117	20.69
		64-QAM	-31.18	31.12	-10.10	1.24	Н		0.095	19.78

Freq		Modulation	Measured	Substitute	Ant.	C.L	Pol	Limit	EF	RP
(MHz) (Bandwid	(Bandwidth)		Level (dBm)	Level (dBm)	Gain(dBd)		w	w	ww	dBm
		QPSK	-28.73	33.38	-10.09	1.24	Н		0.160	22.05
782.0	LTE B13 (10 MHz)	16-QAM	-29.97	32.14	-10.09	1.24	Н	< 3.00	0.120	20.81
	(10 11112)	64-QAM	-30.91	31.20	-10.09	1.24	Н		0.097	19.87



8.2 RADIATED SPURIOUS EMISSIONS

OPERATING FREQUENCY:	<u>779.5 MHz</u>
MEASURED OUTPUT POWER:	<u>24.03 dBm = 0.253 W</u>
I MODE:	<u>LTE B13</u>
MODULATION SIGNAL:	<u>5 MHz QPSK</u>
DISTANCE:	<u>3 meters</u>
■ LIMIT: 43 + 10 log10 (W) =	<u>37.03 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
	1,559.0	-52.49	8.93	-60.24	1.79	V	-53.10	77.13
23205 (779.5)	2,338.5	-45.01	9.83	-48.45	2.20	V	-40.82	64.84
(779.5)	3,118.0	-50.19	11.15	-51.44	2.60	V	-42.89	66.92
	1,564.0	-52.22	8.99	-60.55	1.79	Н	-53.35	77.38
23230 (782.0)	2,346.0	-47.21	9.87	-50.56	2.21	Н	-42.90	66.93
(102.0)	3,128.0	-47.78	11.15	-48.95	2.59	V	-40.39	64.41
	1,569.0	-54.58	9.05	-63.49	1.79	V	-56.23	80.25
23255 (784.5)	2,353.5	-49.74	9.94	-53.12	2.23	Н	-45.41	69.44
()	3,138.0	-50.58	11.18	-51.89	2.60	V	-43.31	67.33



OPERATING FREQUENCY:	<u>782.00 MHz</u>
MEASURED OUTPUT POWER:	<u>24.20 dBm = 0.263 W</u>
MODE:	<u>LTE B13</u>
MODULATION SIGNAL:	10 MHz QPSK
DISTANCE:	<u>3 meters</u>
LIMIT: 43 + 10 log10 (W) =	<u>37.20 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
	1,564.0	-55.04	8.99	-63.37	1.79	Н	-56.17	80.37
23230 (782.0)	2,346.0	-53.19	9.87	-56.54	2.21	V	-48.88	73.08
(132.0)	3,128.0	-50.15	11.15	-51.32	2.59	V	-42.76	66.96



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:	-80 dBW/ MHz (= -50 dBm/ MHz)

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	1609.7		-63.37	9.35	-73.48	1.81	V	-65.94	15.94
782.0	1559.7	Narrow Band	-58.33	8.93	-66.08	1.79	V	-58.94	8.94
784.5	1564.7		-57.12	8.99	-65.45	1.79	V	-58.25	8.25

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)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Margin (dB)
782.0	1608.3	Narrow Band	-53.49	9.35	-63.60	1.81	V	-56.06	6.06

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	4.5182
	5 MHz		16-QAM	25	0	4.5219
10		700.0	64-QAM	25	0	4.5106
13		782.0	QPSK	50	0	9.0174
10 MHz		16-QAM	50	0	8.9947	
			64-QAM	50	0	8.9892

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 32 ~ 37.



8.4 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
		779.5	3.6840	27.976	-67.104	-39.128	
13	5	782.0	3.7024	27.976	-66.906	-38.930	-13.00
13		784.5	3.7074	27.976	-67.331	-39.355	-13.00
	10	782.0	3.6800	27.976	-66.925	-38.949	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 50 ~ 53.

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

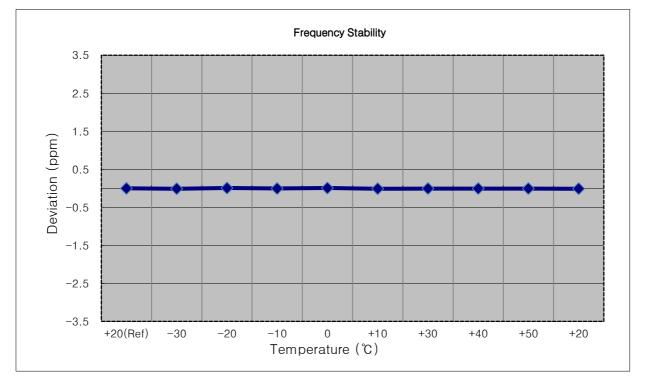
- Plots of the EUT's Band Edge are shown Page 38 ~ 49.



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

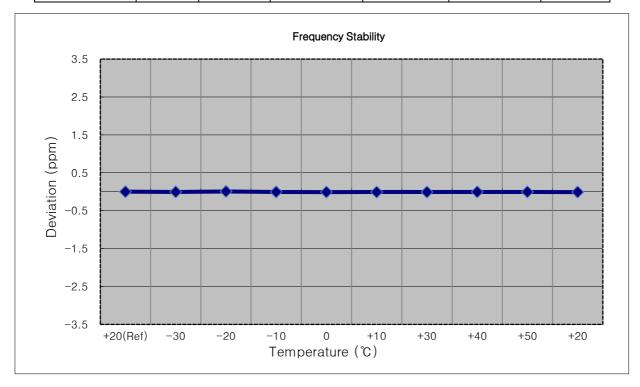
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	779 499 993	0.00	0.000 000	0.0000
100%		-30	779 499 984	-9.10	-0.000 001	-0.0117
100%		-20	779 499 999	6.00	0.000 001	0.0077
100%		-10	779 499 988	-4.20	-0.000 001	-0.0054
100%	3.850	0	779 499 998	5.30	0.000 001	0.0068
100%		+10	779 499 985	-8.00	-0.000 001	-0.0103
100%		+30	779 499 988	-5.10	-0.000 001	-0.0065
100%		+40	779 499 987	-6.10	-0.000 001	-0.0078
100%]	+50	779 499 988	-4.90	-0.000 001	-0.0063
Batt. Endpoint	3.600	+20	779 499 984	-8.50	-0.000 001	-0.0109





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

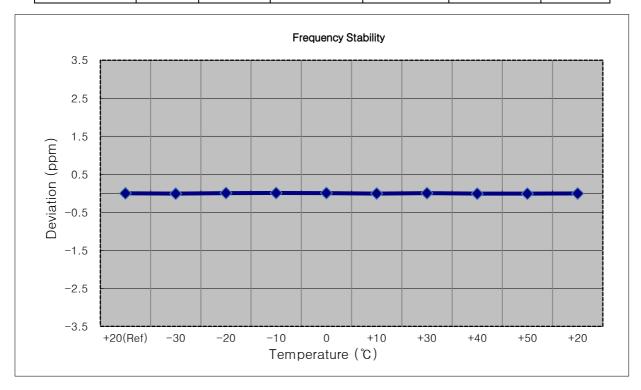
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	782 000 004	0.00	0.000 000	0.0000
100%		-30	782 000 000	-4.30	-0.000 001	-0.0055
100%		-20	782 000 009	4.70	0.000 001	0.0060
100%		-10	781 999 999	-4.80	-0.000 001	-0.0061
100%	3.850	0	781 999 997	-7.00	-0.000 001	-0.0090
100%		+10	781 999 998	-6.20	-0.000 001	-0.0079
100%		+30	781 999 998	-6.60	-0.000 001	-0.0084
100%		+40	782 000 000	-4.10	-0.000 001	-0.0052
100%		+50	781 999 999	-5.10	-0.000 001	-0.0065
Batt. Endpoint	3.600	+20	781 999 996	-7.90	-0.000 001	-0.0101





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

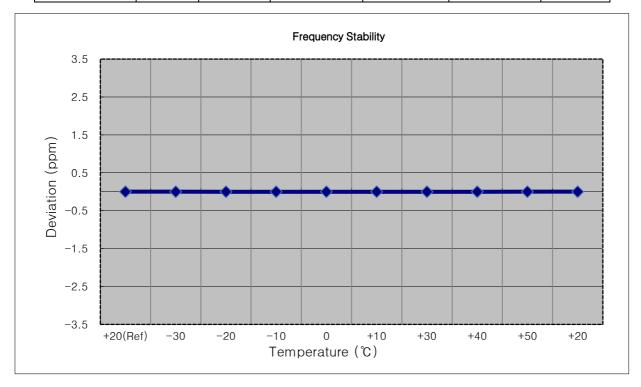
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	784 500 005	0.00	0.000 000	0.0000
100%		-30	784 499 999	-6.50	-0.000 001	-0.0083
100%		-20	784 500 010	4.40	0.000 001	0.0056
100%		-10	784 500 011	5.40	0.000 001	0.0069
100%	3.850	0	784 500 009	4.20	0.000 001	0.0054
100%		+10	784 499 999	-6.20	-0.000 001	-0.0079
100%		+30	784 500 008	3.00	0.000 000	0.0038
100%		+40	784 499 998	-7.10	-0.000 001	-0.0091
100%		+50	784 499 998	-7.40	-0.000 001	-0.0094
Batt. Endpoint	3.600	+20	784 500 002	-3.60	0.000 000	-0.0046





MODE:	LTE 13
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)	782 000 001	0.00	0.000 000	0.0000	
100%		-30	782 000 002	1.00	0.000 000	0.0013	
100%		-20	782 000 000	-1.00	0.000 000	-0.0013	
100%		-10	782 000 000	-1.00	0.000 000	-0.0013	
100%	3.850	0	782 000 000	-0.70	0.000 000	-0.0009	
100%		+10	781 999 999	-1.10	0.000 000	-0.0014	
100%		+30	782 000 000	-0.90	0.000 000	-0.0012	
100%		+40	781 999 999	-1.30	0.000 000	-0.0017	
100%		+50	782 000 002	1.00	0.000 000	0.0013	
Batt. Endpoint	3.600	+20	782 000 002	1.00	0.000 000	0.0013	





FCC ID: A3LSMG715U1

9. TEST PLOTS



	um Analyzer - Occu	•							
	RF 50 Ω 50 Ω		C	SENSE:INT enter Freg: 782.0	00000 MHz	ALIGN AUTO	12:22:29 A Radio Std:	M Dec 18, 2019	Frequency
PASS	59702.000		T	rig: Free Run Atten: 20 dB		d: 500/500	Radio Dev		
		#IFGa	ain:Low #	Atten: 20 dB			Radio Dev	ICE: DTS	
10 dB/div	Ref Offset: Ref 40.00								
Log 30.0									Center Freq
									782.000000 MHz
20.0		_^~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	www.		$\neg v_{\gamma}$			
10.0									
0.00		M							
-10.0		Jen V					\		
-20.0	mon	<u>^</u>					home -	᠋ ᠕᠁᠁ᡘᡊ᠆ᡵᢧᠧᢔ	
-30.0									
-40.0									
-50.0									
-30.0									CF Step 1.000000 MHz
Center 782							Spa	n 10 MHz	Auto Man
#Res BW 1	100 kHz			#VBW 390) kHz		Swe	ep 1 ms	
Occup	ied Band	width		Total	Power	32.6	i dBm		Freq Offset
			32 MHz						0 Hz
Transm	it Freq Err	or 1	1.346 kHz	OBW	Power	99	.00 %		
x dB Ba	ndwidth		5.299 MHz	x dB		-26.	00 dB		
MSG							5		
	-								

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



	m Analyzer - Occupied B	W						
(XI RL Contor Fro	RF 50 Ω AC q 782.000000		SENSE:INT Center Freg: 782.	000000 MHz	ALIGN AUTO	12:22:00 AM Radio Std:	Dec 18, 2019	Frequency
PASS	q 702.00000	#IFGain:Low	Trig: Free Run #Atten: 20 dB		d: 500/500	Radio Devi		
		#IPGalli.Low	#Atten: 20 dB			Rudio Bern		
10 dB/div	Ref Offset 26.8 Ref 40.00 dB							
Log 30.0								Center Freq
20.0								782.000000 MHz
10.0		mun	mmmm	summer of	~~~~			
0.00					<u> </u>			
	N	w			how here			
-20.0	when when when when when when when when				<u></u>	mangan	mary _ an	
-30.0								
-40.0								
-50.0								
								CF Step 1.000000 MHz
Center 782			#VDW 00	0 kU-			10 MHz	
#Res BW 1	UU KHZ		#VBW 39	UKHZ		Swe	ep 1 ms	
Occupi	ed Bandwid	lth	Total	Power	31.5	5 dBm		Freq Offset 0 Hz
	4.5219 MHz							
Transmi	t Freq Error	10.200	kHz OBW	Power	99	0.00 %		
x dB Ba	ndwidth	5.402	MHz x dB		-26.	00 dB		
MSG						S		

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



🎉 Agilent S	Spectrum Analyzer - Occupied	BW						
(X) RL	RF 50 Ω A		SENSE:INT		ALIGN AUTO	12:22:14 Al Radio Std:	MDec 18, 2019	Frequency
PASS	Freq 782.00000	₩IFIZ #IFGain:Low	Talas France Dava	Avg Hold:	500/500	Radio Devi		
10 dB/div	Ref Offset 26. Ref 40.00 d							
Log 30.0								Center Freq
20.0								782.000000 MHz
10.0		marin	Www.man.	, tomorrow	~			
0.00		/						
-10.0					۲. ۲			
	a a constant	Pr					6	
-30.0	what May Anna					muulung	man w	
-40.0								
-50.0								
								CF Step 1.000000 MHz
	782 MHz		<i></i>				n 10 MHz	
#Res B	W 100 kHz		#VBW 390	KHZ		Swe	ep 1 ms	
Occ	upied Bandwi	idth	Total	Power	30.4	dBm		Freq Offset
		4.5106 M	Hz					0 Hz
Tran	smit Freq Error	14.732	kHz OBW	Power	99	.00 %		
x dB	Bandwidth	5.330	MHz x dB		-26.0	00 dB		
MSG								
					-			

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



	Spectrum Analyzer - Oc	cupied BW								- ¢	×
LXI RL	r Freq 782.00		1	Center	SENSE:INT	00000 MHz	ALIGN AUTO	12:28:48 A Radio Std	M Dec 18, 2019	Frequency	y
	Freq 782.00		٦Z +	📕 Trig: F	ree Run		d: 500/500				
PASS		#	FGain:Low	#Atten	: 20 dB			Radio Dev	ice: BTS		
10 dB/di	Ref Offse iv Ref 40.0	et26.8 dB 00 dBm									
Log 30.0										Center	Freq
20.0										782.000000	
20.0			phartonalera	war have a second	whenwhere	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	᠇ᢇᠰᢛᠺᡁ				_
10.0		j j									
0.00							<u> </u>				
-10.0		<u>/</u> ″									
-20.0		A A A A A A A A A A A A A A A A A A A					"\/L~	her worthing			
-30.0	مهر	fr ^{on}							and the start of t		
	work when we										
M											
-50.0											Step
Center	782 MHz							Sna	n 20 MHz	2.000000	MHz Man
	SW 200 kHz			#	VBW 820	kHz			ep 1 ms		Man
Oco	upied Ban	dwidth			Total	Power	32.4	4 dBm		Freq Of	ffset
		9.0	174 M	lHz							0 Hz
Tran	nsmit Freq Ei	rror	25.081	kHz	OBW	Power	99	9.00 %			
x dE	Bandwidth		10.22	MHz	x dB		-26	00 dB			
MSG							I STATU	s			

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



Agilent Spectrum Analyzer - Occupied B	3W						- 6 -
(X) RL RF 50 Ω AC		SENSE:INT Center Freg: 782.00		IGN AUTO	12:28:18 AM Dec Radio Std: Nor		Frequency
Center Freq 782.00000	JMHZ ↔	Trig: Free Run	Avg Hold: 5				
PASS	#IFGain:Low	#Atten: 20 dB		F	Radio Device: I	BTS	
Ref Offset 26.8 10 dB/div Ref 40.00 dE				-			
Log 30.0							Center Freq
							782.000000 MHz
20.0	marilynoholan	elulycentin opphilm looku	montherm	<u>\</u>			
10.0							
0.00	./			γ γ _λ			
-10.0	n ⁶⁷						
-20.0				՟՟ՙֈֈֈ	mlanna		
-30.0					- 04 - 447	Ur hand	
-40.0 hran and and a start and a start							
**							
-50.0							CF Step
Center 782 MHz					Span 2	0 MHz	2.000000 MHz Auto Man
#Res BW 200 kHz		#VBW 820	kHz		Sweep		
Occupied Bandwid	dth	Total I	Power	31.5 d	IBm		Freq Offset
	8.9947 MI	Ηz					0 Hz
Transmit Freq Error	34.525	KHZ OBW F	Power	99.0	0 %		
x dB Bandwidth	10.30 N	IHz x dB		-26.00	dB		
MSG				STATUS			

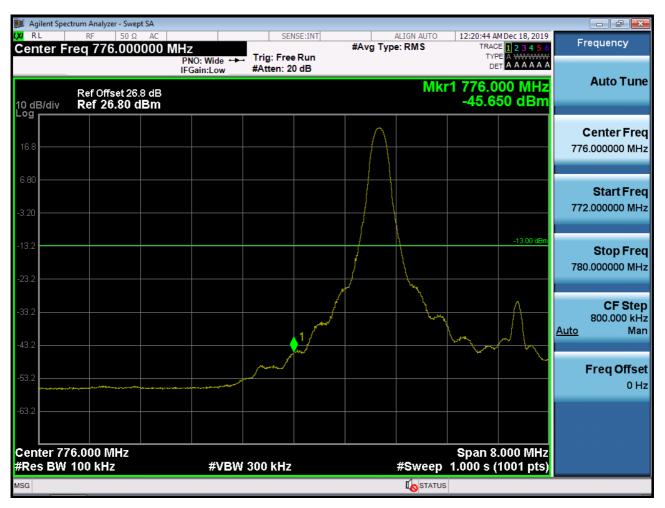
BAND 13. Occupied Bandwidth Plot (Ch.23230 16-QAM RB 50) 10 MHz



Dialent Spectrum Analyzer - Occupied	BW						
XI RF 50 Ω AC		SENSE:INT Center Freg: 782.00		LIGN AUTO	12:28:33 AM D Radio Std: No		Frequency
Center Freq 782.00000	U MIHZ ↔	Trig: Free Run	Avg Hold:	500/500	Raulo Stu. N	one	
PASS	#IFGain:Low	#Atten: 20 dB			Radio Device	BTS	
Ref Offset 26.8 10 dB/div Ref 40.00 dl							
							Center Freq
30.0							782.000000 MHz
20.0		Mr.m. M. M. M. M.					782.000000 WI12
10.0		I COMPANY OF COMPANY	ᡃᠰᢇᢉᢏᢦᡘᠴᢪᡆᠮᢦᡶᢗ᠇ᢦᡘ᠊ᢏᢧ᠆ᡗ	~			
0.00				<u>\</u>			
-10.0	N			<u> </u>			
	he i i			N. A.	ha		
-20.0					har when the	Months.	
-30.0						. whente	
-40.0							
-50.0							CF Step
							2.000000 MHz
Center 782 MHz		<i></i>				20 MHz	<u>Auto</u> Man
#Res BW 200 kHz		#VBW 820	KHZ		Swee	p 1 ms	
Occupied Bandwi	dth	Total F	ower	30.4	dBm		Freq Offset
							0 Hz
	3.9892 MH	12					
Transmit Freq Error	19.306 k	Hz OBW F	ower	99.	.00 %		
x dB Bandwidth	10.15 M	Hz x dB		-26 ()0 dB		
				2010			
				4			
MSG				I STATUS			

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





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



	t Spectrum Analyzer - Swept SA						
LXI RL	r Freq 776.000000 Γ		SENSE:INT	#Avg Typ	ALIGN AUTO e: RMS	12:19:59 AM Dec 18, 2019 TRACE 1 2 3 4 5 6	Frequency
Cente		PNO: Wide +++ Trig: F IFGain:Low #Atten	ree Run : 20 dB				
10 dB/d Log	Ref Offset 26.8 dB liv Ref 26.80 dBm				Mki	1 775.992 MHz -30.277 dBm	Auto Tune
16.8 —							Center Freq 776.000000 MHz
6.80 — -3.20 —					<u></u>		Start Freq 772.000000 MHz
-13.2				and a second		-13.00 dBm	Stop Freq 780.000000 MHz
-33.2 —							CF Step 800.000 kHz <u>Auto</u> Man
-43.2 — -53.2 —	and the state of the						Freq Offset 0 Hz
-63.2							
	r 776.000 MHz 3W 100 kHz	#VBW 300 kH	lz		#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG					I STATUS		

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



J Agilent Spectrum Analyzer - Swep		CENCEANT		12220-10 00 0-10 2010	
KL RF 50 Ω Center Freq 769.000	AC 000 MHz PNO: Wide ↔→→ IFGain:Low	SENSE:INT Trig: Free Run #Atten: 20 dB	ALIGN AUTO #Avg Type: RMS	12:20:18 AM Dec 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A A A A A A	Frequency
Ref Offset 26. 10 dB/div Ref -10.00 d	8 dB		Mk	1 774.976 MHz -53.909 dBm	Auto Tune
-20.0					Center Freq 769.000000 MHz
-40.0				-35.00 dBm	Start Freq 763.000000 MHz
-60.0					Stop Freq 775.000000 MHz
-70.0	๛๛๛๚๛๚๛๛๛๚๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	In	an a	in Araditation	CF Step 1.200000 MHz <u>Auto</u> Man
-90.0					Freq Offset 0 Hz
-100 Start 763.000 MHz #Res BW 10 kHz	#VBW	30 kHz	#Sween	Stop 775.000 MHz 1.000 s (1001 pts)	
MSG		0V-M12	#SWREED		

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



	ctrum Analyzer - Swept SA							
LXI RL	RF 50 Ω AC req 776.000000		NSE:INT	#Avg Type	LIGN AUTO		Dec 18, 2019	Frequency
Center F	req 770.0000001	PNO: Wide ↔ Trig: Free IFGain:Low #Atten: 20	Run			TYP DE		
10 dB/div Log	Ref Offset 26.8 dB Ref 26.80 dBm				Mk	1 775.9 -49.97	84 MHz 72 dBm	Auto Tune
16.8								Center Freq 776.000000 MHz
-3.20								Start Freq 772.000000 MHz
-13.2							-13.00 dBm	Stop Freq 780.000000 MHz
-33.2				/	L	and and a second se		CF Step 800.000 kHz <u>Auto</u> Man
-43.2			1				RMS	Freq Offset 0 Hz
-63.2								
Center 77 #Res BW	76.000 MHz 100 kHz	#VBW 300 kHz			#Sweep	Span 8. 1.000 s (*	000 MHz 1001 pt <u>s</u>)	
MSG								

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



	ctrum Analyzer - Swept SA						
Center F	RF 50Ω AC req 776.000000 M	//Hz	SENSE:INT	#Avg Typ	ALIGN AUTO e: RMS	12:27:10 AM Dec 18, 2019 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide ↔ T	rig: Free Run Atten: 20 dB				
10 dB/div Log	Ref Offset 26.8 dB Ref 26.80 dBm				Mk	r1 776.000 MHz -32.830 dBm	Auto Tune
16.8							Center Freq 776.000000 MHz
6.80						RMS	Start Freq 772.000000 MHz
-13.2						-13.00 dBm	Stop Freq 780.000000 MHz
-33.2			1				CF Step 800.000 kHz <u>Auto</u> Man
-43.2	and a state of the						Freq Offset 0 Hz
-63.2							
Center 77 #Res BW	'6.000 MHz 100 kHz	#VBW 30	0 kHz		#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG					I STATUS		

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



	ectrum Analyzer - Swept SA					
LXI RL	RF 50 Ω AC req 769.000000	MHz	SENSE:INT	ALIGN AUTO #Avg Type: RMS	12:27:29 AM Dec 18, 2019 TRACE 1 2 3 4 5 6	Frequency
Center	1eq 703.000000	PNO: Wide ↔ II	ig: Free Run Atten: 20 dB		TYPE A WWWW DET A A A A A A	A
10 dB/div Log	Ref Offset 26.8 dB Ref -10.00 dBm	ı		Mk	r1 775.000 MHz -55.596 dBm	Auto Tune
-20.0						Center Freq 769.000000 MHz
-30.0					-35.00 dBm	Start Freq 763.000000 MHz
-50.0					1 RM	Stop Freq 775.000000 MHz
-70.0	determinen an skriver alemander ger	~1.4.4.9.4.9.4.1.4.1.4.4.4.4.1.2.4.7.1.1.1.1.4.4.4.4.4.4.4.4.4.4.4.4.4.4	าราสสมได้เสียงรูปสาย 	after an		CF Step 1.200000 MHz <u>Auto</u> Man
-90.0						Freq Offset 0 Hz
	.000 MHz				Stop 775.000 MHz	
#Res BW	10 kHz	#VBW 30	KHZ	#Sweep	1.000 s (1001 pts)	

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





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



🗾 Agilent Spectrum Analyzer - Swept SA				- 6 -
KL RF 50 Ω AC Center Freq 788.000000	MHz	#Avg Type:	IGN AUTO 12:24:04 AM Dec RMS TRACE	Frequency
	PNO: Wide +++ Trig: Free IFGain:Low #Atten: 20			
Ref Offset 26.8 dB 10 dB/div Ref 26.80 dBm			Mkr1 788.040 -26.152	MHz Auto Tune dBm
16.8				Center Freq 788.000000 MHz
-3.20				Start Freq 784.000000 MHz
-13.2	have been a second and a second a secon	1		13.00 dBm Stop Freq 792.000000 MHz
-33.2		and a second a second a second a second a second a second a		CF Step 800.000 kHz <u>Auto</u> Man
-43.2				Freq Offset 0 Hz
-63.2			Span 8.000 Sweep 1.000 s (100) MHz
#Res BW 100 kHz	#VBW 300 kHz	77		

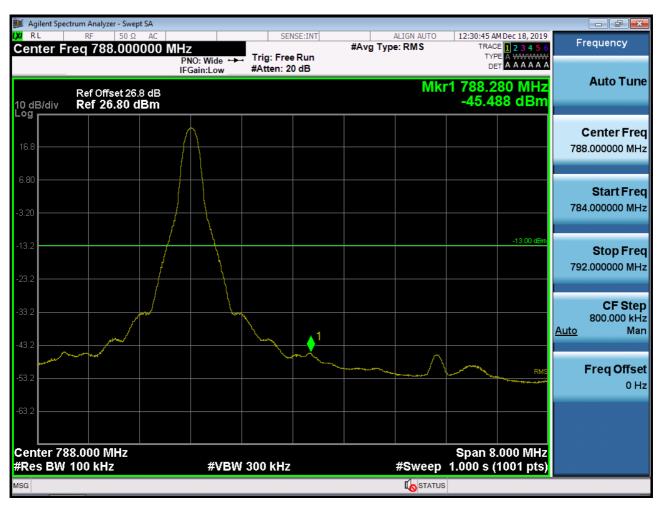
Band 13 Upper Band Edge Plot (5M BW Ch.23255 QPSK_RB_25)



🔰 Agilent Spectrum Analyzer - Swept SA 🗱 RL RF 50 Ω Αί					
ເ⊠ RL RF 50 Ω A/ Center Freq 799.00000	O MHz PNO: Wide ↔	SENSE:INT Trig: Free Run #Atten: 20 dB	ALIGN AUTO	12:24:24 AM Dec 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A A A A A A	Frequency
Ref Offset 26.8 d 10 dB/div Ref -10.00 dB	B	#Atten: 20 dB	Mk	1 793.360 MHz -59.806 dBm	Auto Tune
-20.0					Center Freq 799.000000 MHz
-30.0				-35.00 dBm	Start Freq 793.000000 MHz
-50.0 -60.0					Stop Freq 805.000000 MHz
-70.0	Mone-fanderalissoffice-list-specific	and an and a second and a second a	an feldensetter son fingen and feldensetter and feldensetter and feldensetter and feldensetter and feldensetter	RMS เข้าเราะร่างกับเรียงให้เหตุรายาง	CF Step 1.200000 MHz <u>Auto</u> Man
-90.0					Freq Offset 0 Hz
-100 Start 793.000 MHz				Stop 805.000 MHz	
#Res BW 10 kHz	#VBW 3	10 kHz	#Sweep	1.000 s (1001 pts)	

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)



	ctrum Analyzer - Swept SA						
Center F	RF 50 Ω AC req 788.000000 M	ЛНz	SENSE:INT	ALIGN /		TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide	ig: Free Run .tten: 20 dB				
10 dB/div Log	Ref Offset 26.8 dB Ref 26.80 dBm				Mkr1 78 -2	8.016 MHz 7.361 dBm	Auto Tune
16.8							Center Freq 788.000000 MHz
6.80							Start Freq 784.000000 MHz
-13.2			1			-13.00 dBm	Stop Freq 792.000000 MHz
-33.2			and a second and a s	-typethinton alger - inglin lafter to any	under and of the providence of	PMS	CF Step 800.000 kHz <u>Auto</u> Man
-43.2							Freq Offset 0 Hz
-63.2							
Center 78 #Res BW	38.000 MHz 100 kHz	#VBW 30	0 kHz	#Sw	Spa veep 1.000	un 8.000 MHz) s (1001 pts)	
MSG				K	STATUS		

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



	nt Spectrur	n Analyzer - Swe	•								
LXI RL			AC		SEN	NSE:INT		ALIGN AUTO	12:30:19 AM Dec		Frequency
Cente	er Fred	q 799.000		IZ PNO: Wide ↔ IFGain:Low	Trig: Free #Atten: 2		#Avg Typ	e: RIVIS	TRACE 1 TYPE A DET A	2 3 4 5 6 ₩₩₩₩₩ A A A A A	
10 dB/c	R div R	Ref Offset 26 Ref -10.00	5.8 dB dBm					Mk	1 793.048 -50.598	MHz dBm	Auto Tune
-20.0 —											Center Freq 799.000000 MHz
-30.0	1									-35.00 dBm	Start Freq 793.000000 MHz
-50.0	Androphytholy	Marken Water	Waa								Stop Freq 805.000000 MHz
-70.0			Welgewood	Production of the second se	hi ni ana ana an	^{pa} ryondo <mark>ssi</mark> ngender	alganger og som gen gjør og som	Galat and a sub-	art velder der der der der der der der der der	RMS phytenium	CF Step 1.200000 MHz <u>Auto</u> Man
-90.0											Freq Offset 0 Hz
	793.00 BW 10	0 MHz KHz		#VBW	30 kHz			#Sweep	Stop 805.00 1.000 s (100	0 MHz)1 pts)	
MSG								I STATUS	-		

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



	trum Analyzer - Sw	•								
LXIRL	RF 50			SEN	SE:INT	#Ava Ty	ALIGN AUTO		M Dec 18, 2019	Frequency
Center F	req 5.0150	00000	PNO: Fast +	📕 Trig: Free		#Avg iy	pe. King	TY	PE A WWWWW	
			IFGain:Low	#Atten: 20) dB			D		
							M	kr1 3.684	4 0 GHz	Auto Tune
10 dB/div	Ref 10.00	dBm						-67.1	04 dBm	
Log										
0.00	9									Center Freq
-10.0										5.015000000 GHz
-20.0										
-30.0										
										Start Fred
-40.0										30.000000 MHz
-50.0										
-60.0			_							
-70.0										Stop Fred
-80.0										10.00000000 GHz
-00.0										
Start 30 N	/Hz		I					Stop 10	.000 GHz	CF Step
#Res BW			#VB	W 3.0 MHz			Sweep 17	7.33 ms (2	0001 pts)	997.000000 MHz
MKR MODE TH		Х		Y	FUNC		JNCTION WIDTH		ON VALUE	<u>Auto</u> Man
			684 0 GHz	-67.104 dB				TONCH	ON VALUE	
2 N 1	f	7	77.8 MHz	-3.229 dB						Freq Offset
3										0 Hz
5									=	0 112
6										
8										
9										
11										
•									4	
MSG							🚺 STATU	IS		

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



	trum Analyzer - Swe	•								- đ	×
LXIRL	RF 50 S			SEN	SE:INT	#Ave T	ALIGN AUTO		M Dec 18, 2019	Frequency	v
Center Fr	eq 5.0150	00000	GHZ PNO: Fast ↔	📑 Trig: Free		#/1191	ype. Kino	TY	PE A WWWWW		
			IFGain:Low	#Atten: 20	dB			DI			
							M	(r1 3.70)	2 4 GHz	Auto T	une
10 dB/div	Ref 10.00	dBm						-66.9	06 dBm		
Log	2										
0.00	Y-									Center	
-10.0										5.015000000	GHz
-20.0											
-30.0										01	
-40.0										Start F	
										30.00000	MHZ
-50.0											
-60.0									RMS	Stop F	Fred
-70.0			-	and the second second second			and the second		NUNE Number of States of States	10.000000000	
-80.0										10.00000000	GHZ
Start 30 Ⅳ								Stop 10	.000 GHz		Step
#Res BW	1.0 MHz		#VB	N 3.0 MHz			Sweep 17	7.33 ms (2	0001 pts)	997.000000	
MKR MODE TR		Х		Y		CTION F	UNCTION WIDTH	FUNCTI	DN VALUE	Auto	Man
1 N 1 2 N 1	f	3.7	702 4 GHz 780.2 MHz	-66.906 dB -3.008 dB							
2 N 1 3		/		-3.008 GB						Freq Of	ffset
4											0 Hz
5 6									=		
7											
8											
10											
				III							
								c			
MSG							LO STATU	0			

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



	trum Analyzer - Swept SA							
LXI RL	RF 50 Ω A req 5.0150000		SENSE:IN		ALIGN AUTO	12:25:05 AM Dee TRACE		Frequency
	eq 5.0150000	PNO: Fast + IFGain:Low	Trig: Free Run #Atten: 20 dB		yperitane	TYPE A		Auto Tune
10 dB/div Log	Ref 10.00 dB	m			Mk	r1 3.707 4 -67.331	GHz dBm	Auto Tune
-10.00 -20.0								Center Freq 5.015000000 GHz
-30.0 -40.0 -50.0								Start Freq 30.000000 MHz
-60.0 -70.0 -80.0							RMS	Stop Freq 10.000000000 GHz
Start 30 N #Res BW	1.0 MHz	#VB	W 3.0 MHz		Sweep 17	Stop 10.00 .33 ms (2000	11 pts)	CF Step 997.000000 MHz Auto Man
MKR MODE TR 1 N 1 2 N 1 3 4 5	f f	× 3.707 4 GHz 787.2 MHz	Y -67.331 dBm -2.373 dBm	FUNCTION F	FUNCTION WIDTH	FUNCTION VA		Freq Offset 0 Hz
6 7 8 9 10 11								
MSG					I o status	5	F	

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



	trum Analyzer - Sw	•								
LXI RL	^{RF} 50 ⊈ req 5.0150		CH2	S	ENSE:INT	#Ava T	ALIGN AUTO		MDec 18, 2019 E 1 2 3 4 5 6	Frequency
	req 5.0150	00000	PNO: Fast IFGain:Low				, per rune	TYF DE		
10 dB/div	Ref 10.00	dBm					Mk	r1 3.680 -66.9) 0 GHz 25 dBm	Auto Tune
Log 0.00 -10.0 -20.0										Center Freq 5.015000000 GHz
-30.0 -40.0 -50.0										Start Freq 30.000000 MHz
-60.0 -70.0 -80.0			~~~~						RMS	Stop Freq 10.000000000 GHz
Start 30 M #Res BW			#V	BW 3.0 MH	z		Sweep 17	Stop 10 .33 ms (2	.000 GHz 0001 pts)	CF Step 997.000000 MHz Auto Man
MKR MODE TR	RC SCL	× 3.6	80 0 GHz 78.2 MHz	Y -66.925 (-2.372 (lBm	NCTION F	UNCTION WIDTH	FUNCTIO	DN VALUE	
3 4 5									E	Freq Offset 0 Hz
6 7 8										
9 10 11				m						
MSG								5		

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-2107-FC037-P