

FCC LTE REPORT

Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Address:

129, Samsung-ro, Yeongtong-gu,

Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue: March 20, 2019 Location: HCT CO., LTD.,

74, Seoicheon-ro 578beon-gil, Majang-myeon,

Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA **Report No.:** HCT-RF-1903-FC026-R2

A3LSMT725

APPLICANT:

FCC ID:

SAMSUNG Electronics Co., Ltd.

Model(s):	SM-T725
Additional Model(s):	T725N, T727
EUT Type:	Tablet
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§27, §2

Mada	Tri Franzisanovi	Emission Designator		ERP		
Mode (MHz)	Tx Frequency (MHz)		Modulation	Max. Power (W)	Max. Power (dBm)	
		4M49G7D	QPSK	0.030	14.70	
LTE – Band13 (5)	779.5 –784.5	4M50W7D	16QAM	0.024	13.77	
		4M51W7D	64QAM	0.019	12.82	
		8M98G7D	QPSK	0.030	14.79	
LTE – Band13 (10)	782.0	8M97W7D	16QAM	0.024	13.89	
		8M98W7D	64QAM	0.019	12.88	

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)

- Mark

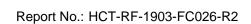
Report prepared by : Jae Ryang Do Engineer of Telecommunication Testing Center Report approved by : Kwon Jeong Manager of Telecommunication Testing Center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1903-FC026	March 14, 2019	- First Approval Report
HCT-RF-1903-FC026-R1	March 17, 2019	 Revised the worst case configuration on page 14. Added the note on page 17.
HCT-RF-1903-FC026-R2	March 20, 2019	- Revised the emission limit on page 17.



CO.,LTD.

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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:	A3LSMT725			
Application Type:	Certification			
FCC Classification:	PCS Licensed Transmitter (PCB)			
FCC Rule Part(s):	§27, §2			
EUT Type:	Tablet			
Model(s):	SM-T725			
medel(e):				
	T705NL T707			
Additional Model(s):	T725N, T727			
Tx Frequency:	779.5 MHz –784.5 MHz (LTE – Band 13 (5MHz))			
	782 MHz (LTE – Band 13 (10 MHz))			
Date(s) of Tests:	March 04, 2019 ~ March 13, 2019			
(-,				



2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Tablet with GSM/GPRS/EGPRS/UMTS and LTE. It also supports IEEE 802.11 a/b/g/n/ac (HT20/40/80), ANT+, Bluetooth, BT LE. The EUT was a Tablet with Accessories(Keyboard and Charging pad). (Keyboard - Model : SAMSUNG, Manufacture : EH-FT720) (Charging Doc – Model: SAMSUNG, Manufacture : EE-D3200)

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
Pond Edge	- KDB 971168 D01 v03r01 – Section 6.0
Band Edge	- 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 C63.26-2015 – Section 5.2
	- 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 \geq 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.

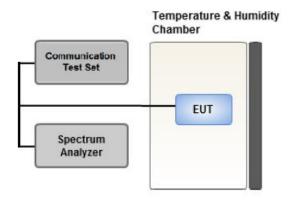
Test Note

- 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



3.4 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.

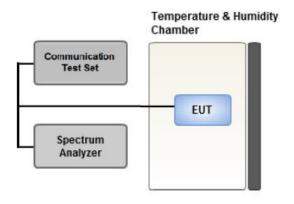
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

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

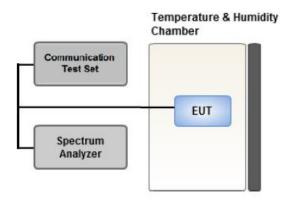
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured 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 ≥ 2 * Span / 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 > $3 \times RBW$
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

Test Notes

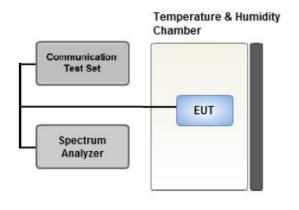
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a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

- 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.

[Worst case]

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

Note:

- SM-T725 & additional models were tested and the worst case results are reported.

(Worst case : SM-T725)

- SM-T725 with Stand alone&Keyboard&Charging pad were tested and the worst case results are reported.

(Worst case : Stand alone)



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
	* QPSK	5	Low	1	0
			High	1	24
Pond Edge			Low	1	0
Band Edge			High	1	49
		5, 10	Low,	Full RB	0
			High		0
Spurious and Harmonic Emissions at			Low,		
	* QPSK	5, 10	Mid,	1	0
Antenna Terminal			High		

[Worst case]

Note:

- SM-T725 & additional models were tested and the worst case results are reported.

(Worst case : SM-T725)

- SM-T725 with Stand alone&Keyboard&Charging pad were tested and the worst case results are reported.

(Worst case : Stand alone)

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
REOHDE & SCHWARZ	SCU 18 / AMPLIFIER	10094	04/17/2018	Annual	04/17/2019
Wainwright	WHK1.2/15G-10EF/H.P.F	4	04/04/2018	Annual	04/04/2019
Wainwright	WHK3.3/18G-10EF/H.P.F	2	04/04/2018	Annual	04/04/2019
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	5001	06/07/2018	Annual	06/07/2019
Agilent	E3632A/DC Power Supply	KR75303243	05/09/2018	Annual	05/09/2019
Schwarzbeck	UHAP/ Dipole Antenna	557	03/31/2017	Biennial	03/31/2019
Schwarzbeck	UHAP/ Dipole Antenna	558	03/31/2017	Biennial	03/31/2019
ESPEC	SU-642 / Chamber	93000718	08/07/2018	Annual	08/07/2019
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	09/14/2018	Annual	09/14/2019
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	10/04/2018	Annual	10/04/2019
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/25/2017	Biennial	04/25/2019
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	04/25/2017	Biennial	04/25/2019
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY52090906	06/08/2018	Annual	06/08/2019
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/21/2018	Annual	06/21/2019
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/22/2018	Annual	10/22/2019
Agilent	8960 (E5515C)/ Base Station	MY48360800	09/27/2018	Annual	09/27/2019
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	08/23/2018	Biennial	08/23/2020
Schwarzbeck	VULB9160/ Bilog Antenna	9160-3368	08/09/2018	Biennial	08/09/2020
Schwarzbeck	VULB9160/ Hybrid Antenna	760	04/06/2017	Biennial	04/06/2019
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6201502997	08/13/2018	Annual	08/13/2019
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/30/2019	Annual	01/30/2020
REOHDE &	SMB100A/ SIGNAL GENERATOR	477000	07/10/2010	A	07/10/0010
SCHWARZ	(100kHz~40GHz)	177633	07/19/2018	Annual	07/19/2019
REOHDE & SCHWARZ	ESU40 / EMI TEST RECEIVER	100524	07/27/2018	Annual	07/27/2019
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.

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)	5.71

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
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

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 Emissions	§2.1053, §27.53(g)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS
Undesirable Emissions in the 1559 – 1610 MHz band	2.1053, 27.53(f)	< -70dBW/MHz EIRP (wideband) < -80dBW EIRP (narrowband)	PASS

Note regarding all Emission Mask test plots:

The FCC limit is $65 + 10\log_{10}(P_{[Watts]}) = -35$ dBm in a 6.25 kHz bandwidth. 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.

(Limit = -35.0 dBm)

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch	Ch./ Freq. Measured		Substitute	Substitute Ant. Gain		Del	ERP	
channel	Freq.(MHz)	Level(dBm)	Level(dBm)	(dBd)	C.L	Pol.	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	Ch./ Freq. Measured		Substitute Ant. Gain		C.L	Pol.	EIRP	
channel	Freq.(MHz)	Level(dBm)	Level(dBm)	(dBi)	U.L	FUI.	w	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	Н	0.456	26.59

<u>EIRP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)</u>

- 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.



GSM 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

<u>16QAM Modulation</u> 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		C.L Pol	Limit	EF	RP
(MHz)	(Bandwidth)		Level (dBm)	Level (dBm)	Gain(dBd)			W	W	dBm	
		QPSK	-32.89	25.85	-10.32	0.83	Н		0.030	14.70	
779.5		16-QAM	-33.82	24.92	-10.32	0.83	Н		0.024	13.77	
		64-QAM	-34.77	23.97	-10.32	0.83	н		0.019	12.82	
		QPSK	-33.11	25.79	-10.33	0.83	Н		0.029	14.63	
782.0	LTE B13 (5 MHz)	16-QAM	-33.97	24.93	-10.33	0.83	Н	< 3.00	0.024	13.77	
	(0 111 12)	64-QAM	-34.95	23.95	-10.33	0.83	н		0.019	12.79	
		QPSK	-33.54	25.62	-10.34	0.83	н		0.028	14.46	
784.5		16-QAM	-34.24	24.92	-10.34	0.83	Н		0.024	13.76	
		64-QAM	-35.24	23.92	-10.34	0.83	Н		0.019	12.76	

	Mod (Bandwidth)		Modulation	Measured	Substitute	Ant.	C.L	Pol	Limit	EF	RP
			Level (dBm)	Level (dBm)	Gain(dBd)			W	W	dBm	
	82.0 (10 MHz)	QPSK	-32.95	25.95	-10.33	0.83	н	< 3.00	0.030	14.79	
782.0		16-QAM	-33.85	25.05	-10.33	0.83	Н		0.024	13.89	
	()	64-QAM	-34.86	24.04	-10.33	0.83	Н		0.019	12.88	



8.2 RADIATED SPURIOUS EMISSIONS

OPERATING FREQUENTY:	<u>779.50 MHz</u>
MEASURED OUTPUT POWER:	<u>14.70 dBm = 0.030 W</u>
MODE:	LTE B13
MODULATION SIGNAL:	<u>5 MHz QPSK</u>
DISTANCE:	3 meters
LIMIT: 43 + 10 log10 (W) =	<u>27.70 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
	1,559.0	-55.57	6.73	-63.92	1.23	н	-60.57	75.27
23205 (779.5)	2,338.5	-53.74	7.87	-59.04	1.56	н	-54.88	69.58
(110.0)	3,118.0	-56.18	9.21	-60.77	1.83	V	-55.54	70.24
	1,564.0	-52.57	6.76	-61.05	1.23	н	-57.68	72.38
23230 (782.0)	2,346.0	-54.58	7.92	-59.88	1.55	н	-55.66	70.36
(102.0)	3,128.0	-57.52	9.21	-61.98	1.82	V	-56.74	71.44
	1,569.0	-51.82	6.78	-60.43	1.23	V	-57.03	71.73
23255 (784.5)	2,353.5	-56.32	7.97	-61.62	1.53	н	-57.33	72.03
(1010)	3,138.0	-56.31	9.20	-60.88	1.84	н	-55.67	70.37



OPERATING FREQUENTY:	<u>782.00 MHz</u>
MEASURED OUTPUT POWER:	<u>14.79 dBm = 0.030 W</u>
MODE:	LTE B13
MODULATION SIGNAL:	<u>10 MHz QPSK</u>
DISTANCE:	<u>3 meters</u>
LIMIT: 43 + 10 log10 (W) =	<u>27.79 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBd)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
	1,564.0	-55.55	6.76	-68.33	1.23	Н	-60.66	75.44
23230 (782.0)	2,346.0	-54.44	7.92	-64.04	1.55	Н	-55.52	70.31
(102.0)	3,128.0	-57.65	9.21	-66.41	1.82	V	-56.87	71.66



1559 MHz ~ 1610 MHz BAND

OPERATING FREQUENTY:	<u>779.5 MHz, 782.0 MHz, 784.5 MHz</u>
MEASURED OUTPUT POWER:	<u>5 MHz QPSK</u>
DISTANCE:	<u>3 meters</u>

-70 dBW/ MHz (= -40 dBm/ MHz)

WIDEBAND EMISSION LIMIT:	
--------------------------	--

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	1569.67		-55.56	6.78	-64.17	1.23	V	-60.77	20.77
782.0	1559.68	WIDEBAND	-51.75	6.73	-60.10	1.23	Н	-56.75	16.75
784.5	1564.57		-50.43	6.76	-58.91	1.23	н	-55.54	15.54

 OPERATING FREQUENTY: <u>782.0 MHz</u> MEASURED OUTPUT POWER: 10 MHz QPSK

DISTANCE:

3 meters

WIDEBAND EMISSION LIMIT:

-70 dBW/ MHz (= -40 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)
782.0	1565.01	WIDEBAND	-55.52	6.76	-64.00	1.23	V	-60.63	20.63



8.3 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
	5 MHz		QPSK	25	0	4.4941
			16-QAM	25	0	4.5013
10			64-QAM	25	0	4.5046
13	13 10 MHz		QPSK	50	0	8.9793
			16-QAM	50	0	8.9737
			64-QAM	50	0	8.9775

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 31 ~ 36.

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	3.7124	27.976	-67.214	-39.238	
13	5	782.0	3.7084	27.976	-67.193	-39.217	12.00
13		784.5	3.7284	27.976	-67.349	-39.373	-13.00
	10	782.0	3.6910	27.976	-67.320	-39.344	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 49 ~ 52.

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 37 ~ 48.



8.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

MODE:

<u>LTE 13</u>

OPERATING FREQUENCY:

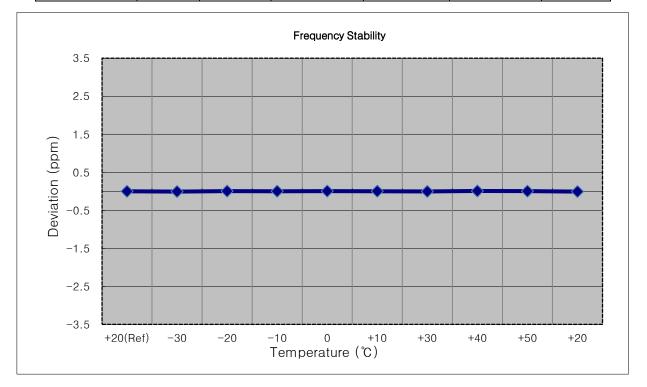
REFERENCE VOLTAGE:

DEVIATION LIMIT:

CHANNEL:

<u>779,500,000 Hz</u> <u>23205 (5 MHz)</u> <u>3.85 VDC</u> Emission must remain in band

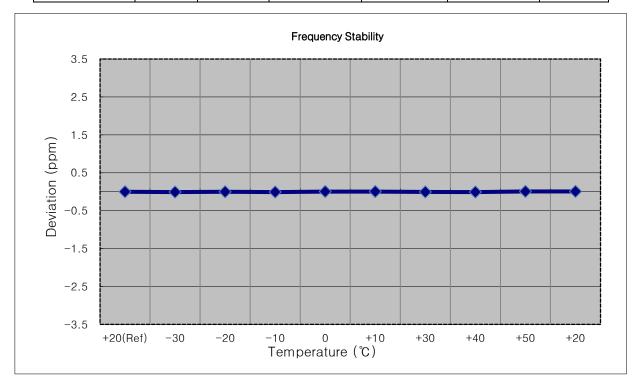
Voltage Power Temp. Frequency Frequency Deviation ppm (VDC) (%) (°C) (Hz) Error (Hz) (%) 779 499 992 0.000 000 100% +20(Ref) 0.00 0.0000 100% -30 779 499 988 -4.60 -0.000 001 -0.0059 100% -20 779 499 997 4.80 0.000 001 0.0062 100% -10 779 499 995 2.20 0.000 000 0.0028 100% 3.850 0 779 499 997 4.90 0.000 001 0.0063 100% +10 779 499 995 2.20 0.000 000 0.0028 779 499 990 -2.30 0.000 000 100% +30 -0.0030 7.00 100% +40 779 499 999 0.000 001 0.0090 100% +50 779 499 995 2.80 0.000 000 0.0036 Batt. Endpoint 3.400 +20 779 499 987 -5.30 -0.000 001 -0.0068





MODE:	LTE 13
OPERATING FREQUENCY:	<u></u> <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

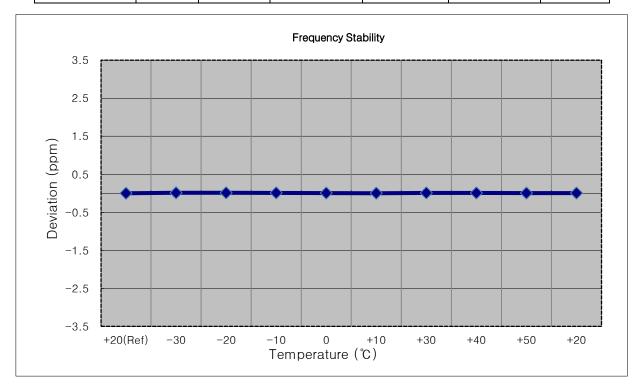
Voltage	Power	Temp.	Frequency	Frequency	Deviation		
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm	
100%		+20(Ref)	781 999 998	0.00	0.000 000	0.0000	
100%		-30	781 999 991	-6.70	-0.000 001	-0.0086	
100%	3.850	-20	781 999 996	-1.80	0.000 000	-0.0023	
100%		-10	781 999 991	-6.50	-0.000 001	-0.0083	
100%		0	782 000 002	3.80	0.000 000	0.0049	
100%		+10	782 000 001	3.50	0.000 000	0.0045	
100%		+30	781 999 993	-4.70	-0.000 001	-0.0060	
100%		+40	781 999 991	-6.60	-0.000 001	-0.0084	
100%		+50	782 000 003	5.40	0.000 001	0.0069	
Batt. Endpoint	3.400	+20	782 000 004	5.60	0.000 001	0.0072	





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

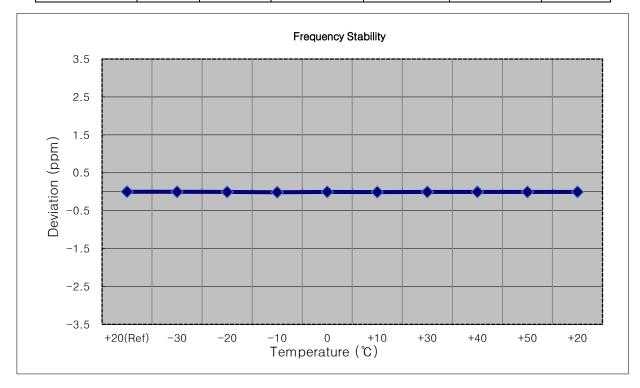
Voltage	Power	Temp.	Frequency	Frequency	Deviation		
(%)	(VDC)	(°°)	(Hz)	Error (Hz)	(%)	ppm	
100%		+20(Ref)	784 500 009	0.00	0.000 000	0.0000	
100%		-30	784 500 018	9.40	0.000 001	0.0120	
100%	3.850	-20	784 500 019	9.70	0.000 001	0.0124	
100%		-10	784 500 017	8.20	0.000 001	0.0105	
100%		0	784 500 014	5.00	0.000 001	0.0064	
100%		+10	784 500 011	2.20	0.000 000	0.0028	
100%		+30	784 500 017	7.70	0.000 001	0.0098	
100%		+40	784 500 016	6.60	0.000 001	0.0084	
100%		+50	784 500 013	4.40	0.000 001	0.0056	
Batt. Endpoint	3.400	+20	784 500 014	4.50	0.000 001	0.0057	





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)	(°°)	(Hz)	(Hz) Error (Hz)		ppm	
100%		+20(Ref)	781 999 993	0.00	0.000 000	0.0000	
100%		-30	781 999 991	-2.50	0.000 000	-0.0032	
100%	3.850	-20	781 999 988	-5.60	-0.000 001	-0.0072	
100%		-10	781 999 982	-10.80	-0.000 001	-0.0138	
100%		0	781 999 990	-3.50	0.000 000	-0.0045	
100%		+10	781 999 985	-7.70	-0.000 001	-0.0098	
100%		+30	781 999 989	-4.60	-0.000 001	-0.0059	
100%		+40	781 999 989	-4.10	-0.000 001	-0.0052	
100%		+50	781 999 988	-5.00	-0.000 001	-0.0064	
Batt. Endpoint	3.400	+20	781 999 989	-3.80	0.000 000	-0.0049	





9. TEST PLOTS



	rum Analyzer - Occupied B	W					
LXI RL	RF 50 Ω AC		SENSE:INT		ALIGN AUTO	05:49:21 PM Mar 06, 2019	Frequency
Center Fre	eq 782.00000) MHz	Center Freq: 782. Trig: Free Run		d: 500/500	Radio Std: None	riequeiley
PASS		#IFGain:Low	#Atten: 20 dB	Avginoi	u. 500/500	Radio Device: BTS	
		#IFGdill.LOW	witten: 20 ab			Rudio Berrice. B To	
10 dB/div	Ref Offset 26.8 Ref 40.00 dE						
Log							
30.0							Center Freq
							782.000000 MHz
20.0							102.000000 111112
10.0		man	www.www.www.	man			
0.00					+		
-10.0		/			\		
-20.0		<u> </u>			+ t		
-30.0	man man				<u>ل</u> م	mannon	
-40.0							
-50.0							
							CF Step
Center 78	2 MHz					Span 10 MHz	1.000000 MHz Auto Man
#Res BW			#VBW 39	0 kHz		Sweep 1 ms	Auto Mari
Occup	ied Bandwid	lth	Total	Power	30.6	dBm	Freq Offset
4.4941 MHz							
Transm	it Freq Error	13.994 k	Hz OBW	Power	99	.00 %	
		4 074			26		
X UB Ba	ndwidth	4.971 N	lHz xdB		-20.	00 dB	
MSG					I STATUS	3	

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



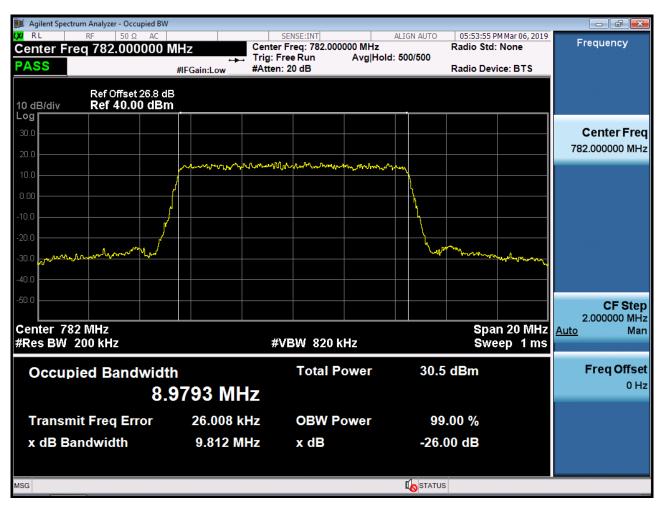
Agilent Spectrum Ana X RL RF						ALTON C.			- @ X
Center Freq 7	50 Ω AC 82.000000 M	Hz	Center Fr	SE:INT eq: 782.000		ALIGN AUT	Radio St	6 PM Mar 06, 2019 d: None	Frequency
PASS		₩ #IFGain:Low	Trig: Free #Atten: 20		Avg Hold	1: 500/500		evice: BTS	
10 dB/div R	ef Offset 26.8 dB ef 40.00 dBm								
Log 30.0									Center Freq
20.0									782.000000 MHz
10.0		mmm	And the man	how	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	\sim			
0.00						\			
-10.0									
-20.0						\downarrow \downarrow			
-30.0 -44	mon					\ \	᠉᠋ᠬ᠕᠕᠆ᠬ	Manna	
-40.0									
-50.0									CF Step
Center 782 MH							Cn	an 10 MHz	1.000000 MHz
#Res BW 100 H			#VB	W 390 k	Hz			veep 1 ms	
Occupied	Bandwidth	1		Total P	ower	29	9.7 dBm		Freq Offset
	4.5	5013 MH	z						0 Hz
Transmit Fr	eq Error	12.859 k	Hz	OBW P	ower		99.00 %		
x dB Bandw	vidth	4.915 M	Hz	x dB		-2	6.00 dB		
MSG						Гю sta	TUS		

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



Agilent Spectrum Analyzer									
Center Freq 782.	50 Ω AC 0000000 MHz #IFGain:Low	SENSE:INT Center Freq: 782.00 → Trig: Free Run #Atten: 20 dB		Radio S 500/500	td: None	Frequency			
	fset 26.8 dB 0.00 dBm			-					
30.0 20.0						Center Freq 782.000000 MHz			
10.0	, marine and a second s	r, mar and a second second	M. Market	~					
-10.0									
-30.0 mm -40.0	www			honor and the second se	and and a started by				
-50.0						CF Step 1.000000 MHz			
Center 782 MHz #Res BW 100 kHz		#VBW 390	kHz	SI Si	oan 10 MHz weep 1 ms	<u>Auto</u> Man			
Occupied Bandwidth Total Power 29.8 dBm 4.5046 MHz						Freq Offset 0 Hz			
Transmit Freq			ower	99.00 %					
x dB Bandwidt	th 4.957	MHz xdB		-26.00 dB					
MSG									

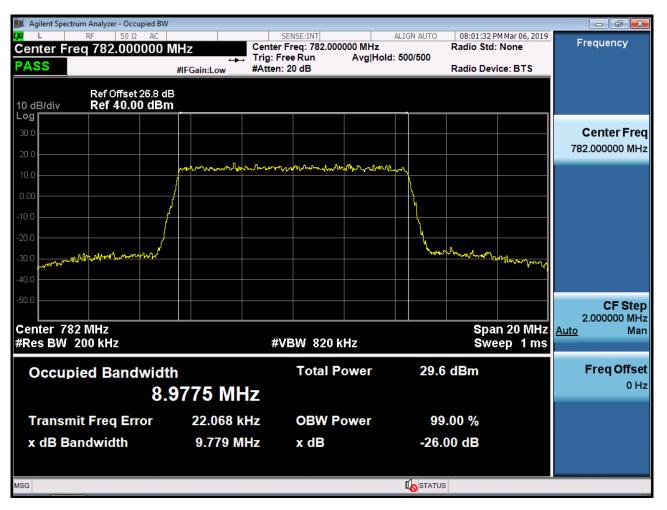
BAND 13. Occupied Bandwidth Plot (Ch.23230 64-QAM RB 25) 5 MHz



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

	um Analyzer - Occupied BW						
Center Fre	RF 50 Ω AC eq 782.000000 M		SENSE:INT Center Freq: 782.000 Trig: Free Run #Atten: 20 dB		Radi 00/500	53:39 PM Mar 06, 2019 o Std: None o Device: BTS	Frequency
10 dB/div	Ref Offset 26.8 dB Ref 40.00 dBm				<u> </u>		
30.0							Center Freq 782.000000 MHz
10.0		ᡁᠰᢇ᠈ᠰᡅᡊᢛᡗ᠇ᠬᠯᢏᡧ _{ᡊ᠇}	᠋᠋᠕ᠬ᠇ᠼᡣᠬᢪᡃᡪᢩᡳᡗᡶᡁᠮᠳᡗ᠇	wynewy Mwanger	\		
-10.0							
-20.0	www.hww.hwlln				how have	unun de la marca	
-40.0							CF Step
Center 782 MHz #Res BW 200 kHz #\			#VBW 8201	(Hz		Span 20 MHz Sweep 1 ms	2.000000 MHz
Occupied Bandwidth Total Power 29.7 dBm 8.9737 MHz						Freq Offset 0 Hz	
Transmit Freq Error 18.350 kHz			OBW Power		%		
x dB Bandwidth 9.783 MI		z x dB		-26.00 dB			
MSG					STATUS		

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



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



SG				I STATUS		
	′6.000 MHz 100 kHz	#VBW 300 kHz		#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
;3.2						
3.2						Freq Offso
3.2		1		- V		<u>Auto</u> Ma
3.2					\wedge	CF Ste 800.000 kH
3.2						780.00000 MIP
3.2					-13.00 dBm	Stop Fre 780.000000 MH
20						
.20						Start Fre 772.000000 MH
.80						
6.8			(\		Center Fre 776.000000 MH
0 dB/div ^{og} r	Ref Offset 26.8 dB Ref 26.80 dBm				1 775.168 MHz -49.506 dBm	
		PNO: Wide +++ Trig: Free IFGain:Low #Atten: 2		Mile		Auto Tur
	req 776.000000	MHz	#Avg 1	ype: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWW DET A A A A A A	Frequency
RL	ctrum Analyzer - Swept SA RF 50 Ω AC		NSE:INT	ALIGN AUTO	05:48:12 PM Mar 06, 2019	

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



	ctrum Analyzer - Swept SA								×
enter F	RF 50 Ω AC req 776.000000		ee Run	#Avg Typ	ALIGN AUTO	TRAC	M Mar 06, 2019 E 1 2 3 4 5 6 E A WWWWW T A A A A A A	Frequency	
	Ref Offset 26.8 dB	IFGain:Low #Atten:			Mk	r1 775.7	20 MHz	Auto Tu	une
dB/div	Ref 26.80 dBm				_	-36.39	98 dBm		
16.8								Center F 776.000000 M	
6.80							┷┲╤╌┞┶┙ ^{┿┉} ┺┲┲╍╝ ^{╕┎┍┲} ╋╍┱ _┲ ┱┯		
3.20								Start F 772.000000 M	
3.2							-13.00 dBm	Oton F	
3.2								Stop F 780.000000 M	
								CF S	ste
3.2			~~~					800.000 <u>Auto</u> N	kH Ma
3.2								Freq Off	fse
3.2								C	0 H
3.2									
	76.000 MHz 100 kHz	#VBW 300 kH	z		#Sweep	Span 8. 1.000 s ('	000 MHz 1001 pt <u>s</u>)		
SG					STATUS				

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



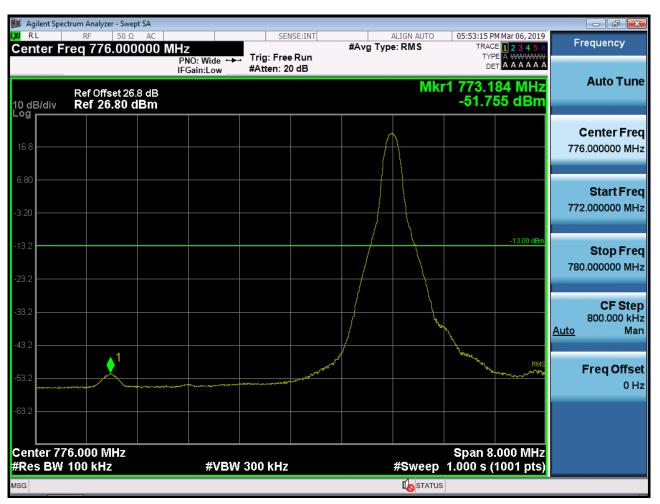


Band 13 Lower Emission Mask (763 MHz ~ 775 MHz) Plot (5M BW Ch.23205 QPSK_RB25_0)

Note:

The limit of plot is incorrect. (Limit = -35dBm)





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



	ctrum Analyzer - Swept SA									- - X
XIRL	RF 50 Ω AC	A1 1_	SENSE			ALIGN AUTO		M Mar 06, 2019	Fr	equency
Center F	req 776.000000 I	PNO: Wide ↔ IFGain:Low	Trig: Free R #Atten: 20 d	un	Avg Type	E RIVIS	TYP	E 1 2 3 4 5 6 E A WWWW T A A A A A A A		
10 dB/div Log	Ref Offset 26.8 dB Ref 26.80 dBm					Mkı	1 775.7 -37.2	84 MHz 66 dBm		Auto Tune
										enter Freq
16.8									776	.000000 MHz
6.80								RMS		Start Freq
-3.20									772	.000000 MHz
-13.2								-13.00 dBm		Stop Freq
-23.2									780	.000000 MHz
23.2										CF Step
-33.2									Auto	800.000 kHz Man
43.2	and a start of the	and a second								
-53.2									I	Freq Offset 0 Hz
-63.2										
Center 77 #Res BW	76.000 MHz 100 kHz	#VBW	300 kHz			#Sween	Span 8.	.000 MHz 1001 pts)		
ISG								neer proj		

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



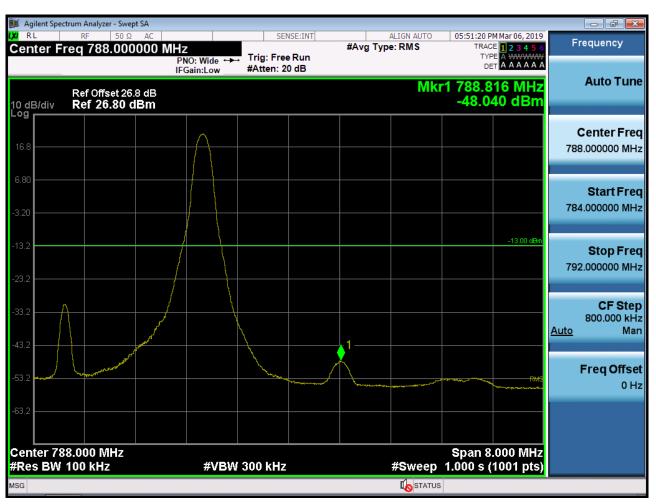
Band 13 Lower Emission Mask (763 MHz ~ 775 MHz) Plot (10M BW Ch.23230 QPSK_RB50_0)

Center Freq 769.000000 MHz PNO: Wide PNO:		ectrum Analyzer - Swept SA						
PNO: Wide Trig: Free Run #Atten: 20 dB Trig: Free Run #Atten: 20 dB Auto Tu Ref Offset 26.8 dB Mkr1 774.568 MHz -49.014 dBm Auto Tu 0 dB/div Ref -10.00 dBm -49.014 dBm -49.014 dBm -20	Center F	1	1Hz	SENSE:INT		TRACE	1 2 3 4 5 6	Frequency
Ref Offset 26.8 dB MIKT 1-74,506 MiF2 10 dB/div Ref -10.00 dBm -49.014 dBm -20 -49.014 dBm -49.014 dBm -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 -20 <td></td> <td></td> <td>PNO: Wide ↔ Trig:</td> <td></td> <td></td> <td>TYPE</td> <td>A WWWWW</td> <td></td>			PNO: Wide ↔ Trig:			TYPE	A WWWWW	
200 Center Fr 200 300 300 32.95 def 400 32.95 def 400 </td <td>10 dB/div</td> <td></td> <td></td> <td></td> <td>Mkr1</td> <td>1 774.56 -49.01</td> <td>8 MHz 4 dBm</td> <td>Auto Tune</td>	10 dB/div				Mkr1	1 774.56 -49.01	8 MHz 4 dBm	Auto Tune
-40.0								Center Freq 769.000000 MHz
.60.0							-32.96 dBm	Start Freq 763.000000 MHz
-70.0	-50.0				 and N-ala Nich ranges	,a.J.,h.Y.M.A.J.A.J.A.J.	RMS	Stop Freq 775.000000 MHz
-90.0		han dan dan dan dan dan dan dan dan dan d	annel/1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	angeneratur Tenter anger get				CF Step 1.200000 MHz <u>Auto</u> Man
-100	-90.0							Freq Offset 0 Hz
Start 763.000 MHz Stop 775.000 MHz	Start 763				S	top 77 <u>5.0</u>	00 MH <u>z</u>	
#Res BW 10 kHz	#Res BW	10 kHz	#VBW 30 kł	łz	Sweep 1	1.000 s (1	001 pts)	

Note:

The limit of plot is incorrect. (Limit = -35dBm)





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



							m Analyzer - Swept SA	
Frequency	05:50:34 PM Mar 06, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWWW	IGN AUTO	#Avg Typ	NSE:INT		Hz	RF 50 Ω AC q 788.000000 N	Center F
A	DET A A A A A A				#Atten: 2	PNO: Wide ++- IFGain:Low		
Auto Tune	1 788.248 MHz -36.552 dBm	Mkr					Ref Offset 26.8 dB Ref 26.80 dBm	10 dB/div Log
Center Freq								
788.000000 MHz								16.8
Start Fred							···	6.80
784.000000 MHz								-3.20
Oten Eres	-13.00 dBm							-13.2
Stop Fred 792.000000 MHz								
								-23.2
CF Step 800.000 kHz					~	\		-33.2
<u>Auto</u> Man	RMS							-43.2
Freq Offset								-53.2
0 Hz								ca a
								-63.2
	Span 8.000 MHz							Center 78
	1.000 s (1001 pts)	Sweep			300 kHz	#VBW	IU KHZ	#Res BW

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



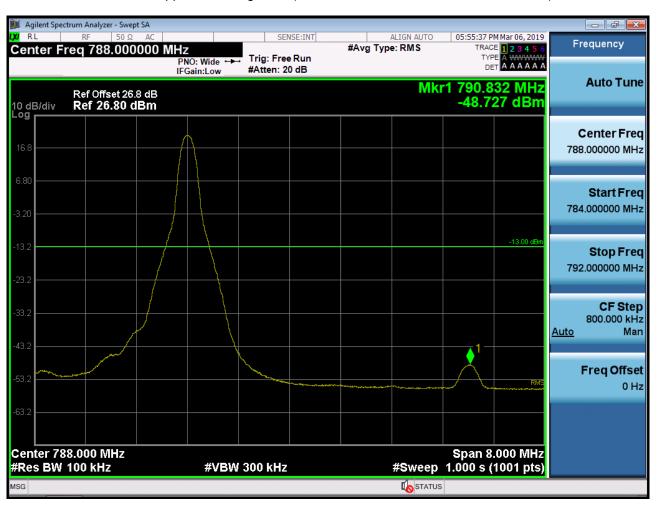
Band 13 Upper Emission Mask (793 MHz ~805 MHz) Plot (5M BW Ch.23255 QPSK_RB25_0)

	ctrum Analyzer - Swept SA					
Center E	RF 50 Ω AC req 799.000000 M	MHz	SENSE:INT	ALIGN AUTO #Avg Type: RMS	05:50:53 PM Mar 06, 2019 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide ↔ IFGain:Low	Trig: Free Run #Atten: 20 dB	• //		
10 dB/div Log	Ref Offset 26.8 dB Ref -10.00 dBm			Mk	r1 793.240 MHz -61.033 dBm	Auto Tune
-20.0						Center Freq 799.000000 MHz
-30.0					-32.96 dBm	Start Freq 793.000000 MHz
-50.0 -60.0						Stop Freq 805.000000 MHz
-70.0	veskistifelioneljingnerkistereta		Mannadolpyria hwing an	geneficipesentidestation การประกับรายางจะการ	RMS	CF Step 1.200000 MHz <u>Auto</u> Man
-90.0						Freq Offset 0 Hz
-100 Start 793. #Res BW		#\/B\M	30 kHz	#Swoop	Stop 805.000 MHz 1.000 s (1001 pts)	
#Res DW		#4044	JUNHZ	#Sweep		

Note:

The limit of plot is incorrect. (Limit = -35dBm)





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



MSG				To STAT	US	
Center 78 #Res BW	8.000 MHz 100 kHz	#VBW :	300 kHz	#Swee	Span 8.000 MHz p 1.000 s (1001 pts)	
-63.2						0112
-53.2						Freq Offset
-43.2				hard don't margare growth a strange traget	RMS	<u>Auto</u> Man
-33.2			1			CF Step 800.000 kHz
-23.2						792.000000 MHz
-13.2					-13.00 dBm	Stop Freq
-3.20						Start Freq 784.000000 MHz
6.80						Ctort From
16.8						Center Freq 788.000000 MHz
10 dB/div	Ref Offset 26.8 dB Ref 26.80 dBm			M	kr1 788.224 MHz -37.104 dBm	
Center F	req 788.000000	PNO: Wide ↔→ IFGain:Low	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWW DET A A A A A A	
X/ RL	ctrum Analyzer - Swept SA RF 50 Ω AC		SENSE:INT	ALIGN AUTO		

Band 13 Upper Band Edge Plot (10M BW Ch.23230 QPSK_QPSK_RB_50)



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

							m Analyzer - Swept S	
Frequency	05:55:11 PM Mar 06, 2019 TRACE 1 2 3 4 5 6	ALIGN AUTO pe: RMS	#Ava Ty	SENSE:INT			RF <u>50 Ω</u> q 799.0000	<mark>X/</mark> RL Center Er
	DET A A A A A A			Free Run n: 20 dB	uc	PNO: Wie IFGain:Lo	q 735.0000	Center II
Auto Tune	1 793.000 MHz -56.851 dBm	Mkr				8 dB 1 Bm	Ref Offset 26.8 Ref -10.00 dl	10 dB/div Log
Center Freq 799.000000 MHz								-20.0
Start Freq 793.000000 MHz	-32,96 dBm							-30.0
Stop Freq 805.000000 MHz						h.	The second se	-50.0 1
CF Step 1.200000 MHz <u>Auto</u> Man	FMS เจ้างจำเสารณ์สุกษณ์การณ์	(n#1===+L)~=+,=+,=+,=+,=+,=+,=+,=+,=+,=+,=+,=+,=+,=	and and a second second	arthan an a	Ungergen of the state of the st	Carrowski to a carlot a faith and		-70.0
Freq Offset 0 Hz								-90.0
	Stop 805.000 MHz	"O			VBW 30 KH			-100 Start 793.(#Res BW 1
	1.000 s (1001 pts)	#Sweep		2	VEVV JUKH	#	- KHZ	MSG

Note:

The limit of plot is incorrect. (Limit = -35dBm)



	ctrum Analyzer - S										- 6
enter F	^{RF} 5 req 5.015	0Ω AC 0000000	PNO: Fas		Trig: Free		#Avg	ALIGN AUTO	TRA TY	PM Mar 06, 2019 CE 1 2 3 4 5 6 /PE A WWWWW DET A A A A A A	Frequency
dB/div	Ref 10.0	0 dBm	IFGain:Lo	w	#Atten: 20	dB		M	(r1 3.71	2 4 GHz 14 dBm	Auto Tur
9 00).0).0	- ∂ ²										Center Fre 5.015000000 GH
.0 .0											Start Fr 30.000000 M
.0 .0 .0											Stop Fr 10.000000000 G
art 30 M es BW	1.0 MHz	X	#\	/BW 3	3.0 MHz	EII	NCTION	Sweep 17	.33 ms (2	0.000 GHz 20001 pts)	CF Ste 997.000000 M <u>Auto</u> M
		3.	712 4 GHz 777.8 MHz		67.214 dB -4.655 dB	m				E E	Freq Offs 0 I
					111						

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



Agilent Spe	ctrum Analyzer - Sv RF 50				CE-INT		ALIGN AUTO	05-40-42.5	M Mar 06, 2019	
	req 5.0150	00000 G	Hz PNO:Fast ↔ FGain:Low			#Avg Typ		TRAC	M MAP 06, 2019 DE 1 2 3 4 5 6 DE A WWWWW ET A A A A A A A	Frequency
0 dB/div	Ref 10.00) dBm					Mk	r1 3.70 -67.1	8 4 GHz 93 dBm	Auto Tune
	- ∂ ²									Center Fre 5.015000000 GH
0.0 0.0 0.0										Start Fre 30.000000 MH
;0.0 ;0.0 ;0.0									RMS	Stop Fre 10.000000000 G⊦
tart 30 l Res BW	1.0 MHz	X	#VB\	₩ 3.0 MHz	EUN		weep 17	.33 ms (2	.000 GHz 0001 pts)	CF Ste 997.000000 MH <u>Auto</u> Ma
1 N 2 N 3 4 5 6		3.70	8 4 GHz 0.2 MHz	-67.193 dE -4.618 dB	m				E	Freq Offse 0 H
6 7 8 9 0										
									•	

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



RL	rtrum Analyzer - Sw RF 50 9 req 5.0150	Ω AC	GH7		SENS	E:INT	#Ava T	ALIGN AUTO	TRA	PM Mar 06, 2019 CE 1 2 3 4 5 6	Frequency
	leq 5.0150	00000	PNO: Fast IFGain:Low		rig: Free F Atten: 20 (,	TY D		
dB/div g	Ref 10.00	dBm						Mk	r1 3.72 -67.3	8 4 GHz 49 dBm	Auto Tu
9 .0 .0											Center Fr 5.015000000 G
											Start Fr 30.000000 M
										RMS	Stop Fr 10.000000000 G
	1.0 MHz		#VI	3W 3.0) MHz			Sweep 17	.33 ms (2		CF Sto 997.000000 M Auto M
NODE TF		× 3.7 7	28 4 GHz 87.2 MHz		Y .349 dBr .309 dBr	n	NCTION F	UNCTION WIDTH	FUNCTI	ON VALUE	Freq Offs 0
									,		

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



	ctrum Analyzer - Swe	•								- F ×
RL	RF 50 Ω req 5.0150		:Ц ₇	SEI	NSE:INT	#Ava T	ALIGN AUTO		M Mar 06, 2019	Frequency
Senter I	req 5.0150		PNO: Fast + FGain:Low	Trig: Free #Atten: 2			,,	TY		
10 dB/div	Ref 10.00	dBm					Mk	r1 3.69 -67.3	1 0 GHz 20 dBm	Auto Tune
-10.0										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 10.00000000 GHz
Start 30 I #Res BW	MHz 1.0 MHz		#VB	W 3.0 MHz			Sweep 17	Stop 10 .33 ms (2	.000 GHz 0001 pts)	CF Step 997.000000 MH: <u>Auto</u> Mar
MKR MODE TI 1 N 2 N 3 4 5	RC SCL		1 0 GHz 8.2 MHz	Y -67.320 dF -4.416 dF	3m	NCTION	FUNCTION WIDTH	FUNCTI	ON VALUE	Freq Offset
6 7 8 9 10 11				11						
ISG					_					

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-1903-FC020-P
2	HCT-RF-1903-FC021-P
3	HCT-RF-1903-FC022-P
4	HCT-RF-1903-FC023-P
5	HCT-RF-1903-FC024-P
6	HCT-RF-1903-FC025-P
7	HCT-RF-1903-FC026-P