

FCC LTE REPORT

Certification

Applicant Name:		Date of Issue:
SAMSUNG Electronics Co., Ltd.		January 21, 2021
		Location:
Address:		HCT CO., LTD.,
129, Samsung-ro, Yeongte	ong-gu,	74, Seoicheon-ro 578beon-gil, Majang-myeon,
Suwon-si, Gyeonggi-do, 1	6677, Rep. of Korea	Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
		Report No.: HCT-RF-2101-FC074
FCC ID	A3I SMA325M	

APPLICANT:

SAMSUNG Electronics Co., Ltd.

Model(s): SM-A325M/DS SM-A325M Additional Model(s): Mobile Phone EUT Type: FCC Classification: PCS Licensed Transmitter Held to Ear (PCE) FCC Rule Part(s): §27, §2

Mada Tu Francescu Freinia		Emission		ERP		
(MHz)	(MHz)	Designator	Designator Modulation		Max. Power (dBm)	
		4M50G7D	QPSK	0.102	20.07	
LTE – Band13 (5)	779.5 –784.5	4M49W7D	16QAM	0.087	19.37	
		4M51W7D	64QAM	0.068	18.32	
		8M99G7D	QPSK	0.108	20.32	
LTE – Band13 (10)	782.0	8M96W7D	16QAM	0.092	19.62	
		8M96W7D	64QAM	0.071	18.54	

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)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2101-FC074	January 21, 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:	A3LSMA325M
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-A325M/DS
Additional Model(s):	SM-A325M
Tx Frequency:	779.5 MHz –784.5 MHz (LTE – Band 13 (5MHz)) 782 MHz (LTE – Band 13 (10 MHz))
Date(s) of Tests:	December 16, 2020 ~ January 12, 2021
Serial number:	Radiated: R38NB02J7SE Conducted: R38NC01F5SF

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.

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 Randwidth	- KDB 971168 D01 v03r01 – Section 4.3
	- ANSI C63.26-2015 – Section 5.4.4
Pond Edge	- KDB 971168 D01 v03r01 – Section 6.0
Ballu Euge	- 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
Padiated Spurious and Harmonia 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.

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

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

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

Test Note

- Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 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 \ge 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 x 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 x RBW
- 5. Detector = RMS
- 6. Number of sweep points \geq 2 x Span/RBW
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

Test Notes

According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. All measurements were done at 2 channels(low and high operational frequency range.)

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



3.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

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

The frequency stability of the transmitter is measured by:

1. Temperature:

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

environmental chamber.

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

for other than hand carried battery equipment.

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

Test Settings

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

(20°C to provide a reference).

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

least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.8 WORST CASE(RADIATED TEST)

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

and channel bandwidth configurations shown in the test data.

- Please refer to the table below.
- SM-A325M/DS & additional models were tested and the worst case results are reported.

(Worst case : SM-A325M/DS)

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

[Worst case]



3.9 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.

- SM-A325M/DS & additional models were tested and the worst case results are reported.

(Worst case : SM-A325M/DS)

[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	
Band Edge			Low	1	0	
			High	1	49	
		5, 10 H	Low,	Full RB	0	
			High			
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	-	03/09/2020	Annual	03/09/2021
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93008124	03/18/2020	Annual	03/18/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	04/27/2020	Annual	04/27/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2020	Annual	06/04/2021
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/14/2020	Annual	10/14/2021
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/26/2020	Annual	08/26/2021
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	04/26/2019	Biennial	04/26/2021
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/12/2019	Biennial	03/12/2021
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/07/2021	Annual	01/07/2022
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/04/2020	Annual	06/04/2021
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

2. Espectially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. MEASUREMENT UNCERTAINTY

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

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



6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

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

Note:

- 1. See SAR Report
- 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	1 400
Undesirable Emissions in	82 1052 27 52(f)	< -70dBW/MHz EIRP (wideband)	DASS
the 1559 – 1610 MHz band	gz. 1055, 27.55(1)	< -80dBW EIRP (narrowband)	FAOD



7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch	./ Freq.	Measured	Substitute	itute Ant. Gain		Del	EF	RP
channel	Freq.(MHz)	Level(dBm)	Level(dBm)	(dBd)	U.L	J.L POI.	w	dBm
128	824.20	-21.37	38.40	-10.61	0.95	н	0.483	26.84

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

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

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

3) Record the field strength meter's level.

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

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

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

7.2 EIRP Sample Calculation

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

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

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

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

3) Record the field strength meter's level.

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

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

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



7.3. Emission Designator

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

EDGE Emission Designator

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

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz F = Frequency Modulation

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

QPSK Modulation

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

QAM Modulation

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



8. TEST DATA

8.1 EFFECTIVE RADIATED POWER

Freq	Mod	Medulation	Measured	Substitute	Ant.		Del	Limit	EF	۲P
(MHz)	(Bandwidth)	wouldtion	Level (dBm)	Level (dBm)	Gain(dBd)	C.L	FU	w	w	dBm
		QPSK	-30.49	31.51	-10.08	1.36	Н		0.102	20.07
779.5		16-QAM	-31.19	30.81	-10.08	1.36	Н		0.087	19.37
		64-QAM	-32.24	29.76	-10.08	1.36	Н		0.068	18.32
	LTE B13	QPSK	-30.82	31.38	-10.09	1.36	Н		0.098	19.93
782.0		16-QAM	-31.57	30.63	-10.09	1.36	Н	< 3.00	0.083	19.18
		64-QAM	-32.61	29.59	-10.09	1.36	Н		0.065	18.14
		QPSK	-31.04	31.28	-10.10	1.36	Н		0.096	19.83
784.5		16-QAM	-31.79	30.53	-10.10	1.36	Н		0.081	19.08
		64-QAM	-32.82	29.50	-10.10	1.36	Н		0.064	18.05

Freq (MHz)	Mod (Bandwidth)	Modulation Lev	Measured Substitute Level (dBm) Level (dBn	Substitute	Ant. Gain(dBd)	C.L Pol	Pol	Limit	EF	RP
				Level (dBm)				w	W	dBm
782.0	LTE B13 (10 MHz)	QPSK	-30.43	31.77	-10.09	1.36	Н	< 3.00	0.108	20.32
		16-QAM	-31.13	31.07	-10.09	1.36	Н		0.092	19.62
	()	64-QAM	-32.21	29.99	-10.09	1.36	Н		0.071	18.54



8.2 RADIATED SPURIOUS EMISSIONS

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

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
	1 559.0	-54.91	8.93	-61.76	1.94	V	-54.77	-13.00
23205 (779.5)	2 338.5	-54.63	9.83	-56.85	2.41	V	-49.43	-13.00
(110.0)	3 118.0	-57.20	11.15	-57.43	2.82	Н	-49.10	-13.00
	1 564.0	-52.80	8.99	-59.81	1.94	V	-52.76	-13.00
23230 (782.0)	2 346.0	-55.56	9.87	-57.71	2.41	Н	-50.26	-13.00
(3 128.0	-55.65	11.15	-56.10	2.81	Н	-47.76	-13.00
	1 569.0	-54.45	9.05	-61.63	1.94	V	-54.52	-13.00
23255 (784.5)	2 353.5	-55.98	9.94	-58.11	2.41	Н	-50.58	-13.00
	3 138.0	-57.34	11.18	-57.32	2.82	Н	-48.96	-13.00



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

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
23230	1 564.0	-54.63	8.99	-61.64	1.94	Н	-54.59	-13.00
	2 346.0	-55.61	9.87	-57.76	2.41	н	-50.31	-13.00
(102.0)	3 128.0	-58.57	11.15	-59.02	2.81	Н	-50.68	-13.00



1559 MHz ~ 1610 MHz BAND

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

Operating Frequency (MHz)	Measured Frequency (MHz)	EMISSION TYPE	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Margin (dB)
779.5	1607.1		-63.74	9.35	-72.68	1.99	н	-65.32	15.32
782.0	1606.0	Narrow Band	-63.78	9.33	-72.60	1.99	н	-65.26	15.26
784.5	1606.2		-63.82	9.33	-72.64	1.99	Н	-65.30	15.30

Note:

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

OPERATING FREQUENCY:	<u>782.0 MHz</u>
MEASURED OUTPUT POWER:	10 MHz QPSK
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	1607.1	Narrow Band	-63.85	9.35	-72.79	1.99	Н	-65.43	15.43

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	4.5017
5 MHz		16-QAM	25	0	4.4889	
		64-QAM	25	0	4.5068	
13	13	- 782.0	QPSK	50	0	8.9914
10	10 MHz		16-QAM	50	0	8.9643
			64-QAM	50	0	8.9631

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	3.6860	27.976	-67.164	-39.188	
10	5	782.0	3.7044	27.976	-67.100	-39.124	12.00
13		784.5	3.6885	27.976	-67.250	-39.274	-13.00
	10	782.0	3.7099	27.976	-67.041	-39.065	

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>3.86 VDC</u>
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ррт
100%		+20(Ref)	779 499 995	0.00	0.000 000	0.0000
100%		-30	779 499 987	-8.00	-0.000 001	-0.0103
100%		-20	779 499 983	-11.90	-0.000 002	-0.0153
100%		-10	779 499 988	-6.70	-0.000 001	-0.0086
100%	3.860	0	779 499 977	-17.30	-0.000 002	-0.0222
100%		+10	779 499 986	-9.00	-0.000 001	-0.0115
100%		+30	779 499 989	-5.50	-0.000 001	-0.0071
100%		+40	779 499 989	-5.40	-0.000 001	-0.0069
100%		+50	779 499 982	-12.70	-0.000 002	-0.0163
Batt. Endpoint	3.400	+20	779 499 985	-9.90	-0.000 001	-0.0127





Report No.: HCT-RF-2101-FC074

MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>782,000,000 Hz</u>
CHANNEL:	<u>23230 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.86 VDC</u>
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ррт
100%		+20(Ref)	781 999 991	0.00	0.000 000	0.0000
100%		-30	781 999 978	-12.30	-0.000 002	-0.0157
100%		-20	781 999 981	-10.00	-0.000 001	-0.0128
100%		-10	781 999 984	-6.40	-0.000 001	-0.0082
100%	3.860	0	781 999 983	-7.80	-0.000 001	-0.0100
100%		+10	781 999 983	-7.20	-0.000 001	-0.0092
100%		+30	781 999 980	-10.30	-0.000 001	-0.0132
100%		+40	781 999 976	-14.20	-0.000 002	-0.0182
100%		+50	781 999 983	-8.10	-0.000 001	-0.0104
Batt. Endpoint	3.400	+20	781 999 985	-6.10	-0.000 001	-0.0078





■ MODE:	LTE 13
OPERATING FREQUENCY:	<u>784,500,000 Hz</u>
CHANNEL:	<u>23255 (5 MHz)</u>
REFERENCE VOLTAGE:	<u>3.86 VDC</u>
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ррт
100%		+20(Ref)	784 499 989	0.00	0.000 000	0.0000
100%		-30	784 499 979	-9.90	-0.000 001	-0.0126
100%		-20	784 499 976	-12.50	-0.000 002	-0.0159
100%		-10	784 499 983	-5.90	-0.000 001	-0.0075
100%	3.860	0	784 499 982	-7.00	-0.000 001	-0.0089
100%		+10	784 499 975	-13.10	-0.000 002	-0.0167
100%		+30	784 499 980	-8.60	-0.000 001	-0.0110
100%		+40	784 499 980	-8.90	-0.000 001	-0.0113
100%		+50	784 499 987	-2.00	0.000 000	-0.0025
Batt. Endpoint	3.400	+20	784 499 979	-9.10	-0.000 001	-0.0116





■ MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>782,000,000 Hz</u>
CHANNEL:	<u>23230 (10 MHz)</u>
REFERENCE VOLTAGE:	3.86 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ррт
100%		+20(Ref)	781 999 991	0.00	0.000 000	0.0000
100%		-30	781 999 982	-9.00	-0.000 001	-0.0115
100%		-20	781 999 980	-11.10	-0.000 001	-0.0142
100%		-10	781 999 985	-6.20	-0.000 001	-0.0079
100%	3.860	0	781 999 988	-3.30	0.000 000	-0.0042
100%		+10	781 999 980	-10.80	-0.000 001	-0.0138
100%		+30	781 999 982	-9.40	-0.000 001	-0.0120
100%		+40	781 999 986	-5.20	-0.000 001	-0.0066
100%		+50	781 999 984	-7.60	-0.000 001	-0.0097
Batt. Endpoint	3.400	+20	781 999 987	-4.60	-0.000 001	-0.0059





FCC ID: A3LSMA325M

9. TEST PLOTS



M Agilent Spect	rum Analyzer - Occupied BW		and the second second		-	FORTE ALL DESCRIPTION	
Center Fr	RF 50Ω AC eq 782.000000 Γ	MHz #IFGain:Low #	SENSE:INT] ALIGN AUTO 08:22:0 Center Freq: 782.000000 MHz Radio St Trig: Free Run Avg Hold: 500/500 #Atten: 20 dB Radio De			:22:01 PM Dec 17, 2020 io Std: None io Device: BTS	Frequency
10 dB/div	Ref Offset 26.5 dl Ref 40.00 dBm	3					
30.0 20.0							Center Freq 782.000000 MHz
.10.0		Innorm	n.m.n.				
-10.0					h		
-30.0 - A.A	mannan				home	mann	
-50.0							CF Step 1.000000 MHz
Center 78 #Res BW	2 MHz 100 kHz		#VBW 390 k	Hz		Span 10 MHz Sweep 1 ms	<u>Auto</u> Man
Occupied Bandwidth 4.5017 MHz			Total P	ower	30.7 dB	m	Freq Offset 0 Hz
Transm x dB Ba	nit Freq Error andwidth	21.832 kH 4.916 MH	z OBW P z x dB	ower	99.00 -26.00 d	% B	
MSG					STATUS		

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



Magilent Spectru	m Analyzer - Occupied BW		the contraction of					
Center Fre	RF 50 Ω AC cq 782.000000 M	Hz #IFGain:Low	Center Freq: 782.000000 MHz Rav Trig: Free Run Avg Hold: 500/500 #Atten: 20 dB Rav		08:21:29 F Radio Std: Radio Dev	M Dec 17, 2020 : None ice: BTS	Frequency	
10 dB/div	Ref Offset 26.5 dB Ref 40.00 dBm				_			
30.0								Center Freq 782.000000 MHz
10.0		mm	mm	mmm	~~~			
-10.0								
-20.0 -30.0 Malmal	mmunm				hin	JAN M	Murmu	
-40.0								
Center 782 #Res BW 1	2 MHz 100 kHz	1 	#VBW 39	0 kHz		Spa Swe	n 10 MHz ep 1 ms	CF Step 1.000000 MHz <u>Auto</u> Man
Occupied Bandwidth 4.4889 MHz		Tota Z	Power	29.8	dBm		Freq Offset 0 Hz	
Transmi x dB Bai	it Freq Error ndwidth	16.390 ki 4.880 Mi	Hz OBW Hz x dB	Power	99. -26.0	00 % 0 dB		
MSG					STATUS			

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



Magilent Spectr	um Analyzer - Occupied BW		and the factor of the second	The second s	Charles and the second	
Center Fro	RF 50 Ω AC eq 782.000000 M	Hz Cer Trig #IFGain:Low #At	SENSE:INT ALIGN AUTO 08:21:46 PM Dec 17, 2020 Center Freq: 782.000000 MHz Radio Std: None Trig: Free Run Avg Hold: 500/500 #Atten: 20 dB Radio Device: BTS			Frequency
10 dB/div	Ref Offset 26.5 dE Ref 40.00 dBm	3				
30.0 20.0						Center Freq 782.000000 MHz
10.0		mmmm	mmm	m		
-10.0						
-20,0	De an av					
-30.0 -40.0	Marine Partone				m m m	
-50.0						CF Step 1.000000 MHz
Center 78 #Res BW	2 MHz 100 kHz		#VBW 390 kHz	SI	oan 10 MHz weep 1 ms	<u>Auto</u> Man
Occupied Bandwidth 4.5068 MHz		n 5068 MHz	Total Power	29.0 dBm		Freq Offset 0 Hz
Transm x dB Ba	it Freq Error Indwidth	9.249 kHz 4.886 MHz	OBW Power x dB	99.00 % -26.00 dB		
MSG				STATUS		

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



M Agilent Spectru	im Analyzer - Occupied	BW		-		-		
Center Fre	RF 50 Ω AG	0 MHz #IFGain:Low	Center Freq: 782.000000 MHz Trig: Free Run Avg Hold: 500/500 #Atten: 20 dB Radio Device: BTS			MDec 17, 2020 : None rice: BTS	Frequency	
10 dB/div	Ref Offset 26.5 Ref 40.00 dl	i dB Bm			_			
30.0 20.0								Center Freq 782.000000 MHz
10:0		monument	un han hanne	Maron Maron	~			
-10.0		1			han	4		
-20.0 -30.0	n All And Such Ally	₽ ²			1	WWW	hham	
-40.0								
Center 782 #Res BW 2	2 MHz 200 kHz		#VBW 820	kHz		Spa Swe	n 20 MHz ep 1 ms	CF Step 2.000000 MHz <u>Auto</u> Man
Occupied Bandwidth 8.9914 MHz		Total I	Total Power 30		30.8 dBm		Freq Offset 0 Hz	
Transmi x dB Ba	it Freq Error ndwidth	14.869 kH 10.11 MH	Hz OBW F Hz x dB	Power	99. -26.0	00 % 0 dB		
MSG					STATUS			

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



M Agilent Spectr	rum Analyzer - Occupied BW				
Center Fro	RF 50 Ω AC eq 782.000000 M	AHZ Center Trig: #IFGain:Low #Atte	SENSE:INT Pr Freq: 782.000000 MHz Free Run Avg Hold n: 20 dB	Dec 17, 2020 Ione Frequency e: BTS	
10 dB/div	Ref Offset 26.5 dB Ref 40.00 dBm				
30.0					Center Freq 782.000000 MHz
10.0		monthemation	mmmman allaland and and and and and and and and and		
-10.0					
-20.0 -30.0 4411	allahardh) ^k			Mar Mahar	MMM
-40.0					
-50.0 Center 78	2 MHz			Span	20 MHz Auto Man
#Res BW	200 kHz	#	VBW 820 kHz	Swee	ep 1 ms
Occupied Bandwidth 8.9643 MHz		n 9643 MHz	Total Power	29.9 dBm	Freq Offset 0 Hz
Transm x dB Ba	it Freq Error andwidth	20.460 kHz 10.69 MHz	OBW Power x dB	99.00 % -26.00 dB	
MSG				STATUS	

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



M Agilent Spectr	um Analyzer - Occupied BW				_			
Center Fre	Center Freq 782.000000 MHz			2.000000 MHz Avg Hold	ALIGN AUTO	08:26:56 P Radio Std: Radio Dev	MDec 17, 2020 None ice: BTS	Frequency
10 dB/div	Ref Offset 26.5 dl Ref 40.00 dBn	3 1						
30.0								Center Freq 782.000000 MHz
10.0		monum	manin	www.	-n			
-10.0		/						
-20.0	mannama				ha	manhand		
-40.0							and the second of the	
-50.0								CF Step 2.000000 MHz
Res BW	2 MHz 200 kHz		#VBW 8	20 kHz		Spa Swe	n 20 MHz ep 1 ms	<u>Auto</u> Man
Occupied Bandwidth 8.9631 MHz		Tot Z	al Power	28.8	dBm		Freq Offset 0 Hz	
Transm x dB Ba	it Freq Error Indwidth	24.239 k 9.752 M	Hz OB1 Hz x dl	N Power B	99 -26.	0.00 % 00 dB		
MSG					To STATU:	8		

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



Magilent Spe	ectrum Analyzer - Swept SA				the state of the state	
Center F	RF 50 Ω AC Freq 776.000000	MHZ PNO: Wide Trig: Free	#Avg 1 #Avg 1	ALIGN AUTO	08:20:28 PM Dec 17, 2020 TRACE 2 3 4 5 0 TYPE A WWWWW	Frequency
10 dB/div	Ref Offset 26.5 dB Ref 26.50 dBm	IFGain:Low #Atten: 2	0 dB	Mk	1 775.392 MHz -48.328 dBm	Auto Tune
16.5			ſ			Center Freq 776.000000 MHz
-3.50						Start Freq 772.000000 MHz
-13.5				X	-13.00 oBm	Stop Freq 780.000000 MHz
-33.5					- THE	CF Step 800.000 kHz <u>Auto</u> Man
-43,5						Freq Offset 0 Hz
-53,5						
Center 7 #Res BW	76.000 MHz / 100 kHz	#VBW 300 kHz		#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG				To STATUS		

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



📕 Agilent Spectrum Analyzer - Swept SA					- 6 -
Center Freq 776.000000 N	HZ PNO: Wide → Trig: Free F	#Avg Typ Run	ALIGN AUTO	08:19:42 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWW	Frequency
Ref Offset 26.5 dB 10 dB/div Ref 26.50 dBm	IFGain:Low #Atten: 20	dB	Mkr1	775.992 MHz -36.261 dBm	Auto Tune
16.5					Center Freq 776.000000 MHz
-3.50				RMS	Start Freq 772.000000 MHz
-13.5				-13.00 dBm	Stop Freq 780.000000 MHz
-33.5		1			CF Step 800.000 kHz <u>Auto</u> Man
-43.65					Freq Offset 0 Hz
-63 5 Center 776.000 MHz				Span 8.000 MHz	
#Res BW 100 kHz	#VBW 300 kHz		#Sweep 1	1.000 s (1001 pts)	-

Band 13 Lower Band Edge Plot (5M BW Ch.23205 QPSK_RB_25_0)-1



Agilent Spectrum Analyzer - Swept SA	and the second			
Center Freq 769.000000 N	NHZ PNO: Wide → Trig: Free Run	#Avg Type: RMS	08:20:01 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWW	Frequency
Ref Offset 26.5 dB	IFGain:Low #Atten: 20 dB	Mk	Auto Tune	
-20.0				Center Freq 769.000000 MHz
-30.0			-35.00 dBm	Start Freq 763.000000 MHz
-50.0		and the second second second	River and the second se	Stop Freq 775.000000 MHz
-70.0	เหตุกฎษณรุกการให้มาสรูโทรการใจสมาสามารถใช้สรรมเรื	Array Marker		CF Step 1.200000 MHz <u>Auto</u> Man
-30.0				Freq Offset 0 Hz
-100 Start 763 000 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 (5M BW Ch.23205 QPSK_RB25_0)-2



Agilent Spe	ctrum Analyzer - Swept SA				
Center F	RF 50 Ω AC req 776.000000	MHZ PNO: Wide	T ALIGN AUTO #Avg Type: RMS	08:26:16 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
10 dB/div	Ref Offset 26.5 dB Ref 26.50 dBm	IFGain:Low #Atten: 20 dB	Mł	cr1 775.992 MHz -45.457 dBm	Auto Tune
16.5					Center Freq 776.000000 MHz
-3.50					Start Freq 772.000000 MHz
-13.5				-13.00 dBm	Stop Freq 780.000000 MHz
-33.5 -43.5		1		RINE	CF Step 800.000 kHz <u>Auto</u> Man
-53 5		لللللللللللينديد			Freq Offset 0 Hz
-53.5 Center 77	'6.000 MHz	#VBW 300 kHz	#Sweer	Span 8.000 MHz	
MSG		* VEW 500 KI12	I STAT	JS	

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



Agilent Spe	ctrum Analyzer - Swept SA	-				The second second second	
Center F	RF 50 Ω AC	0 MHz	SENSE:INT	#Avg Type:	IGN AUTO	08:25:31 PM Dec 17, 2020 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide IFGain:Low	#Atten: 20 dB			DET A A A A A A	Auto Tuno
10 dB/div	Ref Offset 26.5 df Ref 26.50 dBm	3 1			Mkı	1 775.872 MHz -37.833 dBm	Adio Tune
16.5							Center Freq 776.000000 MHz
-3,50				ſ		RMS	Start Freq 772.000000 MHz
-13,5						-13.00 dBm	Stop Freq 780.000000 MHz
-33.5		ى يېلىدىدى بىر بىرى بىرى بىرى بىرى					CF Step 800.000 kHz <u>Auto</u> Man
-43.5							Freq Offset 0 Hz
-83.5							
Center 77 #Res BW	76.000 MHz 100 kHz	#VBW 3	00 kHz	4	Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG					To STATUS		

BAND 13. Lower & Upper Band Edge Plot (10M BW Ch.23230 QPSK RB_50_0)-1



Magilent Spec	trum Analyzer - Swept SA				The Real Property and	
Center F	RF 50 Ω AC req 769.000000		SENSE:INT	ALIGN AUTO #Avg Type: RMS	08:25:50 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
10 dB/div	Ref Offset 26.5 dB Ref -10.00 dBm	IFGain:Low #	Atten: 20 dB	Mk	r1 775.000 MHz -48.500 dBm	Auto Tune
-20.0						Center Freq 769.000000 MHz
-30.0					-35.00 dBm	Start Freq 763.000000 MHz
-50.0				- And and a state of the state	RMA	Stop Freq 775.000000 MHz
-70.0	งกระหน่างการการการการการการการการการการการการการก	1447487497494949498497497497497497497497497	oursectors of the stand of the	and a second and a second a s		CF Step 1.200000 MHz <u>Auto</u> Man
-50,0						Freq Offset 0 Hz
-100						
Start 763. #Res BW	000 MHz 10 kHz	#VBW 30) kHz	#Sweep	Stop 775.000 MHz 1.000 s (1001 pts)	

Band 13 Lower Emission Mask (763 MHz ~ 775 MHz) Plot (10M BW Ch.23230 QPSK_RB50_0)-2



Magilent Spec	trum Analyzer - Swep	t SA								
Center Fi	RF 50 Ω req 788.000	AC 000 MHz	0: Wide 🔸	SEI	e Run	#Avg Typ	ALIGN AUTO	08:24:11 PM TRACE TYPE	Dec 17, 2020	Frequency
10 dB/div	Ref Offset 26. Ref 26.50 d	5 dB Bm	ain:Low	#Atten: 2	0 dB		Mk	1 788.30 -46.52	8 MHz 7 dBm	Auto Tune
16.5			\bigwedge							Center Freq 788.000000 MHz
6.50 -3.50										Start Freq 784.000000 MHz
-13.5									-13.00 dBm	Stop Freq 792.000000 MHz
-33.5				ND. I	1					CF Step 800.000 kHz <u>Auto</u> Man
-43,5				Maria		Allenter	anglosionesteriosteriosteriosteriosteriosteriosteriosteriosteriosteriosteriosteriosteriosteriosteriosteriosteri		RMS	Freq Offset 0 Hz
-63.5 Center 78	8.000 MHz							Span 8.	000 MHz	
#Res BW	100 kHz		#VBW	300 kHz			#Sweep	1.000 s (1	001 pts)	

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



Magilent Spe	ctrum Analyzer - Swept SA				The second second second	
Center F	RF 50 Ω AC req 788.000000		SENSE:INT	ALIGN AUTO #Avg Type: RMS	08:23:23 PM Dec 17, 2020 TRACE 2 3 4 5 6 TYPE A WWWWW	Frequency
10 dB/div	Ref Offset 26.5 dB Ref 26.50 dBm	IFGain:Low 4	¥Atten: 20 dB	Mk	1 788.016 MHz -36.853 dBm	Auto Tune
16.5						Center Freq 788.000000 MHz
6.50 -3.50						Start Freq 784.000000 MHz
-13.5					-13.00 dBm	Stop Freq 792.000000 MHz
-33.5			1		RMS	CF Step 800.000 kHz Auto Man
-53,5						Freq Offset 0 Hz
-53,5 Center 78 #Res BW	88.000 MHz	#VBW 3	00 kHz	#Sween	Span 8.000 MHz	
MSG				STATUS		

Band 13 Upper Band Edge Plot (5M BW Ch.23255 QPSK_RB_25_0)-1



Magilent Spe	ctrum Analyzer - Swept SA		the second beaution		1	
Center F	RF 50 Ω AC req 799.000000		ig: Free Run	ALIGN AUTO #Avg Type: RMS	08:23:43 PM Dec 17, 2020 TRACE 2 3 4 5 6 TYPE A	Frequency
10 dB/div	Ref Offset 26.5 dB Ref -10.00 dBm	IFGain:Low #A	tten: 20 dB	Mk	r1 793.036 MHz -60.054 dBm	Auto Tune
-20,0						Center Freq 799.000000 MHz
-30.0 -40.0					-35.00 dBm	Start Freq 793.000000 MHz
-50.0						Stop Freq 805.000000 MHz
-70.0	aller the constructions	*****	eneralististeryk andere	Audiparturas-astrophogonostariaa.el _e atouary ^a toraea	RMS อารารระสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารรัฐสารร	CF Step 1.200000 MHz <u>Auto</u> Man
-30,0						Freq Offset 0 Hz
-100 Start 793	.000 MHz				Stop 805.000 MHz	
#Res BW	10 KHZ	#VBW 30	KHŻ	#Sweep	1.000 s (1001 pts)	
	intent opinpietou			S office	1	

Band 13 Upper Emission Mask (793 MHz ~805 MHz) Plot (5M BW Ch.23255 QPSK_RB25_0)-2



Magilent Spec	trum Analyzer - Swept SA					
Center F	RF 50 Ω AC req 788.000000		ee Run	ALIGN AUTO #Avg Type: RMS	08:28:56 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
10 dB/div	Ref Offset 26.5 dB Ref 26.50 dBm	IFGain:Low #Atten:	20 dB	Mk	r1 788.024 MHz -49.058 dBm	Auto Tune
16.5						Center Freq 788.000000 MHz
6.50 -3.50						Start Freq 784.000000 MHz
-13.5					-13.00 dBm	Stop Freq 792.000000 MHz
-33.5						CF Step 800.000 kHz Auto Man
-53,5					RMS	Freq Offset 0 Hz
Center 78	8.000 MHz 100 kHz	#VBW 300 kH	z	#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG				STATUS	3	

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



Agilent Spe	ctrum Analyzer - Swept SA							
Center F	RF 50 Q AC req 788.000000 I	MHz PNO: Wide Trig: Fro	ENSE:INT	#Avg Typ	ALIGN AUTO e: RMS	08:28:08 P TRAC TYF	M Dec 17, 2020 E 1 2 3 4 5 6 E A *******	Frequency
10 dB/div	Ref Offset 26.5 dB Ref 26.50 dBm	IFGain:Low #Atten:	20 dB		Mk	r1 788.5 -38.8	04 MHz 01 dBm	Auto Tune
16.5								Center Freq 788.000000 MHz
-3.50								Start Freq 784.000000 MHz
-13,5							-13.00 dBm	Stop Freq 792.000000 MHz
-33.5		- Manipurk	1	not service and services of	مرينيدمونا ورا ^ي د شري	Ward Acres Marrie	RMS	CF Step 800.000 kHz <u>Auto</u> Man
-43,5							and and an all of	Freq Offset 0 Hz
Center 78	88.000 MHz					Span 8	.000 MHz	
#Res BW	100 KHZ	#VBW 300 KH	4		#Sweep	1.000 s (1001 pts)	

Band 13 Upper Band Edge Plot (10M BW Ch.23230 QPSK_ QPSK_RB_50_0)-1



Agilent Spee	ctrum Analyzer - Swept SA		A REAL PROPERTY AND		The second second	
Center F	RF 50 Ω AC req 799.000000	MHz PNO: Wide Tri	SENSE:INT	ALIGN AUTO #Avg Type: RMS	08:28:27 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A	Frequency
10 dB/div	Ref Offset 26.5 dB Ref -10.00 dBm	IFGain:Low #At	tten: 20 dB	Mk	r1 793.036 MHz -56.520 dBm	Auto Tune
-20.0						Center Freq 799.000000 MHz
-30.0 -40.0					-35,00 dBm	Start Freq 793.000000 MHz
-50.0 1 -60.0	legere wergebilgeter					Stop Freq 805.000000 MHz
-70.0		merine and the second of the	ก-รมังสีกระจุปัญหรังได้เขาสูงไขยาง	nonfor-united and an	RMS ขึ้นรายความของสารใจรูปอกรายที่สุดสารเหตุ	CF Step 1.200000 MHz Auto Man
-50.0						Freq Offset 0 Hz
-100					Stop DOE 000 MU	
#Res BW	10 kHz	#VBW 301	kHz	#Sweep	1.000 s (1001 pts)	
MSG					1	

Band 13 Upper Emission Mask (793 MHz ~805 MHz) Plot (10M BW Ch.23230 QPSK_RB50_0)-2



Milent Spectrum Analyzer - Swept SA				the second second	
Center Freq 5.01500000		SENSE:INT	ALIGN AU #Avg Type: RMS	TO 08:20:42 PM Dec 17, 2020 TRACE 1 2 3 4 5 0 TYPE A ******	Frequency
10 dB/div Ref 10.00 dBm	IFGain:Low	#Atten: 20 dB		Mkr1 3.686 0 GHz -67.164 dBm	Auto Tune
0 00 10.0 -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 MHz #Res BW 1.0 MHz MKR MODE TRC SCL X	#VBW	3.0 MHz	Sweep	Stop 10.000 GHz 17.33 ms (20001 pts) DTH FUNCTION VALUE	CF Step 997.000000 MHz <u>Auto</u> Man
1 N 1 f 3 2 N 1 f 3 4 5 5 6 7	3.686 0 GHz 777.8 MHz	-67.164 dBm -4.362 dBm		E	Freq Offset 0 Hz
9 10 11 MSG		m	To st	ATUS	

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



Magilent Spectrum Analyzer - Swept SA				The Post State of Street	
Center Freq 5.01500000		SENSE:INT	ALIGN AUTO #Avg Type: RMS	08:22:23 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A ******	Frequency
10 dB/div Ref 10.00 dBm	IFGain:Low	#Atten: 20 dB	Mk	r1 3.704 4 GHz -67.100 dBm	Auto Tune
0.00 2 .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 MHz #Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 17.	Stop 10.000 GHz 33 ms (20001 pts)	CF Step 997.000000 MHz <u>Auto</u> Man
1 N 1 f 3 2 N 1 f 3 3 4 - - - 5 - - - - 6 - - - - - 7 - - - - - -	3.704 4 GHz 780.2 MHz	-67.100 dBm -4.546 dBm		E	Freq Offset 0 Hz
8 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10		.ui	STATUS	*	

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



🧱 Agilent Spectrum Analyzer - Swept SA		the second second second			
Center Freq 5.015000000 G	Hz Trig: F	SENSE:INT	ALIGN AUTO	08:24:26 PM Dec 17, 2020 TRACE 1 2 3 4 5 6 TYPE A ******	Frequency
10 dB/diu Bef 10 00 dBm	IFGain:Low #Atten	: 20 dB	Mk	r1 3.688 5 GHz -67.250 dBm	Auto Tune
					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 MHz #Res BW 1.0 MHz	#VBW 3.0 MH	1z FUNCTIO	Sweep 17	Stop 10.000 GHz 33 ms (20001 pts) FUNCTION VALUE	CF Step 997.000000 MHz <u>Auto</u> Man
1 N 1 f 3.68 2 N 1 f 78 3 4 - - - 5 - - - - 6 - - - - 7 - - - - 8 - - - - 9 - - - - 11 - - - -	8 5 GHz -67.250 7.2 MHz -4.252	dBm dBm			Freq Offset 0 Hz
MSG	m		Co STATUS		

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



Ag	gilent S	pectr	um An	alyzer - Swe	ept SA								
Cer	L nter	Fre	RF q 5	50 s	AC	GHz	SENS	EINT	#Avg Typ	ALIGN AUTO	08:26:31 P TRAC	M Dec 17, 2020	Frequency
						PNO: Fast - IFGain:Low	#Atten: 20	dB		Mk	DE	9 GHz	Auto Tune
10 d Log	B/div	v .	$\frac{\text{Ref}}{2}$	10.00	dBm						-67.04	11 dBm	Center Freq
-10.0 -20.0													5.015000000 GHz
-30,0 -40,0													Start Freq 30.000000 MHz
-50.0 -60.0 -70,0							1					RMS	Stop Freq
-80.0 Sta	rt 30	D M	Hz								Stop 10	.000 GHz	CF Step
#Re	MODE		.0 N	AHz	x	#VB	W 3.0 MHz	FUN	CTION FU	weep 17	.33 ms (2)	0001 pts)	997.000000 MHz <u>Auto</u> Man
2345	N	1	f		<u>3.7</u> 7	78.2 MHz	-67.041 dBr -3.750 dBr	n					Freq Offset 0 Hz
6789													
10 11							m						
MSG	-	_	_							STATUS			

BAND 13. Conducted Spurious Plot (Ch.23230 10 MHz QPSK RB 1_0)



10. APPENDIX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2101-FC074-P