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FCC LTE REPORT

Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Address:

FCC ID:

129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:

November 24, 2022 Location: HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA Report No.: HCT-RF-2211-FC034

A3LSMA146M

APPLICANT:

SAMSUNG Electronics Co., Ltd.

Model(s):SM-A146M/DSAdditional Model(s):SM-A146MEUT Type:Mobile PhoneFCC Classification:PCS Licensed Transmitter Held to Ear (PCE)FCC Rule Part(s):§27, §2

Mode	To Freeman	Emission		ERP		
(MHz)			Modulation	Max. Power (W)	Max. Power (dBm)	
		4M52G7D	QPSK	0.050	16.96	
LTE – Band13 (5)	779.5 –784.5	4M51W7D	16QAM	0.042	16.19	
		4M53W7D	64QAM	0.032	15.11	
		4M50W7D	256QAM	0.016	12.07	
LTE – Band13 (10)	782.0	8M97G7D	QPSK	0.046	16.67	
		9M00W7D	16QAM	0.038	15.81	
		9M00W7D	64QAM	0.030	14.79	
		8M97W7D	256QAM	0.015	11.72	

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>

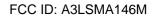
TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2211-FC034	November 24, 2022	- First Approval Report

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:	A3LSMA146M
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-A146M/DS
Additional Model(s):	SM-A146M
Tx Frequency:	779.5 MHz –784.5 MHz (LTE – Band 13 (5 MHz)) 782 MHz (LTE – Band 13 (10 MHz))
Date(s) of Tests:	September 21, 2022~ October 31, 2022
Serial number:	Radiated: 654569e87d337ece Conducted: R93T8000BCB



2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub6.

It also supports IEEE 802.11 a/b/g/n/ac (20/40/80 MHz), Bluetooth, BT LE.

2.2. MEASURING INSTRUMENT CALIBRATION

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

2.3. TEST FACILITY

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



3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

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



3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

measurement capability for signals with continuous operation.

- 2. RBW = 1 5 % of the expected OBW, not to exceed 1 MHz
- 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 1 GHz, 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 = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
- 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 1 GHz, 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;

Result (dBm) = Pg (dBm) - cable loss (dB) + antenna gain (dBi)

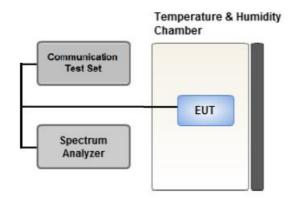
Where: P_g is the generator output power into the substitution antenna.

If the fundamental frequency is below 1 GHz, 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.

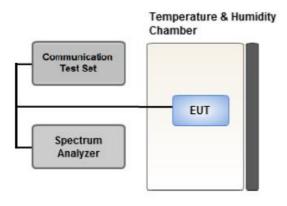
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB 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

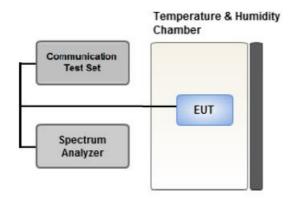
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured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

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Also all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment.

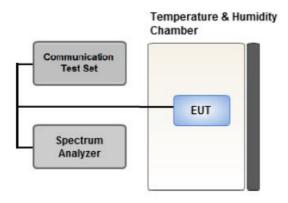
All measurements were done at 2 channels(low and high operational frequency range.)

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

Where Margin < 1 dB the emission level is either corrected by 10 log(1 MHz/ RB) or the emission is integrated over a 1 MHz bandwidth to determine the final result. When using the integration method the integration window is either centered on the emission or, for emissions at the band edge, centered by an offset of 500 kHz from the block edge so that the integration window is the 1 MHz adjacent to the block edge.



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.

Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)

Worst case : Stand alone

- We were performed the RSE test in condition of co-location.

Mode : Stand alone, Simultaneous transmission scenarios

Worst case : Stand alone

- 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-A146M/DS & additional models were tested and the worst case results are reported.

(Worst case : SM-A146M/DS)

Test Description	Modulation	RB size	RB offset	Axis			
	QPSK,		0	x			
Effective Dedicted Dewer	16QAM,	4					
Effective Radiated Power	64QAM,	I					
	256QAM						
Radiated Spurious and Harmonic Emissions	QPSK	1	0	Y			

[Worst case]



3.9 WORST CASE(CONDUCTED TEST)

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

- SM-A146M/DS & additional models were tested and the worst case results are reported.

(Worst case : SM-A146M/DS)

[Worst case]							
Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset		
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	5, 10	Mid	Full RB	0		
		5	Low High	1	0 24		
Band Edge	QPSK	10	Low High	1	0 49		
		5, 10	Low, High	Full RB	0		
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	5, 10	Low, Mid, High	1	0		



4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
H.P.F	FBSR-02B(WHK1.2/15 G- 10EF)	T&M SYSTEM	-	02/18/2023	Annual
H.P.F	FBSR-02B(WHK3.3/18 G- 10EF)	T&M SYSTEM	-	02/18/2023	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	11275	03/11/2023	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/21/2023	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	04/05/2023	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	04/05/2023	Biennial
Chamber	SU-642	ESPEC	93008124	03/04/2023	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/30/2023	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/15/2023	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	05/02/2023	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	05/18/2023	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/29/2023	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2023	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/03/2023	Biennial
Hybrid Antenna	VULB9168	Schwarzbeck	760	02/22/2023	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262116770	07/05/2023	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6200863156	12/29/2022	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2023	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/30/2023	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

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)	2.00 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, <i>k</i> =2)



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(c)	all out-of band emissions	1 700	
Undesirable Emissions in		< -70dBW/MHz EIRP (wideband)	DASS	
the 1559 – 1610 MHz band	§2.1053, 27.53(f)	< -80dBW EIRP (narrowband)	PASS	



7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

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

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

3) Record the field strength meter's level.

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

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

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

7.2 EIRP Sample Calculation

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

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

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

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

3) Record the field strength meter's level.

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

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

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



7.3. Emission Designator

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	Madulation	Measured	Substitute	Ant.		Del	Limit	EF	RP
(MHz)	(Bandwidth)	Modulation	Level (dBm)	Level (dBm)	Gain(dBd)	C.L	Pol	w	W	dBm
		QPSK	-31.39	28.07	-10.08	1.37	Н		0.046	16.62
779.5		16-QAM	-32.18	27.28	-10.08	1.37	Н		0.038	15.83
779.5		64-QAM	-33.23	26.23	-10.08	1.37	Н		0.030	14.78
		256-QAM	-36.27	23.19	-10.08	1.37	Н		0.015	11.74
		QPSK	-31.36	28.06	-10.09	1.37	Н		0.046	16.60
782.0	LTE B13	16-QAM	-32.20	27.22	-10.09	1.37	Н	< 3.00	0.038	15.76
762.0	(5 MHz)	64-QAM	-33.22	26.20	-10.09	1.37	Н	< 3.00	0.030	14.74
		256-QAM	-36.25	23.17	-10.09	1.37	Н		0.015	11.71
		QPSK	-31.18	28.44	-10.10	1.38	Н		0.050	16.96
784.5		16-QAM	-31.95	27.67	-10.10	1.38	Н		0.042	16.19
764.5		64-QAM	-33.03	26.59	-10.10	1.38	Н		0.032	15.11
		256-QAM	-36.07	23.55	-10.10	1.38	Н		0.016	12.07

Freq	Mod	Modulation	Measured	Substitute			Pol	Limit	EF	۲P	
(MHz)	(Bandwidth)		Level (dBm)	Level (dBm)	Gain(dbd)			w	W	dBm	
		QF	QPSK	-31.29	28.13	-10.09	1.37	Н	н	0.046	16.67
700.0	LTE B13	16-QAM	-32.15	27.27	-10.09	1.37	Н		0.038	15.81	
782.0	(10 MHz)	64-QAM	-33.17	26.25	-10.09	1.37	Н	< 3.00	0.030	14.79	
		256-QAM	-36.24	23.18	-10.09	1.37	Н		0.015	11.72	



8.2 RADIATED SPURIOUS EMISSIONS

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

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
	1 559.0	-54.59	8.88	-62.13	1.96	Н	-55.21	-40.00
23205 (779.5)	2 338.5	-52.46	9.96	-55.45	2.47	V	-47.96	-13.00
(11010)	3 118.0	-56.21	11.24	-56.22	2.84	Н	-47.82	-13.00
	1 564.0	-54.44	8.92	-62.22	1.98	V	-55.28	-40.00
23230 (782.0)	2 346.0	-56.30	10.03	-59.12	2.49	V	-51.59	-13.00
(102.0)	3 128.0	-56.97	11.26	-57.40	2.86	V	-49.00	-13.00
	1 569.0	-54.13	8.96	-62.16	1.99	Н	-55.19	-40.00
23255 (784.5)	2 353.5	-55.51	10.10	-58.17	2.51	Н	-50.58	-13.00
(10110)	3 138.0	-57.27	11.28	-57.42	2.89	V	-49.03	-13.00



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

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit
	1 564.0	-55.43	8.92	-63.21	1.98	Н	-56.27	-40.00
23230 (782.0)	2 346.0	-55.34	10.03	-58.16	2.49	V	-50.63	-13.00
(782.0)	3 128.0	-57.48	11.26	-57.91	2.86	Н	-49.51	-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>-70 dBW/ MHz (= -40 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	1607.6		-63.55	9.30	-73.74	1.97	Н	-66.41	26.41
782.0	1608.8	Wide Band	-63.51	9.30	-73.70	1.97	Н	-66.37	26.37
784.5	1606.8		-63.53	9.25	-73.63	1.99	Н	-66.36	26.36

Note:

Since the bandwidth of that Spurious emission is greater than 700 Hz, we applied -70 dBW/MHz according to §27.53(f).

OPERATING FREQUENCY:	<u>782.0 MHz</u>
MEASURED OUTPUT POWER:	<u>10 MHz QPSK</u>
DISTANCE:	<u>3 meters</u>
WIDEBAND EMISSION LIMIT:	-70 dBW/ 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	1607.9	Wide Band	-63.56	9.30	-73.75	1.97	V	-66.42	26.42

-40 dBm/ MHz)

Note:

Since the bandwidth of that Spurious emission is greater than 700 Hz, we applied -70 dBW/MHz according to §27.53(f).



8.3 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
			QPSK	25	0	4.5196
	5 MHz 10 MHz		16-QAM	25	0	4.5140
			64-QAM	25	0	4.5303
13		782.0	256-QAM	25	0	4.5030
13			QPSK	50	0	8.9669
			16-QAM	50	0	8.9974
			64-QAM	50	0	8.9961
			256-QAM	50	0	8.9729

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 44 ~ 51.



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	3.7039	27.976	-67.090	-39.114	
13	5	782.0	3.7119	27.976	-67.192	-39.216	-13.00
13		784.5	3.6980	27.976	-67.074	-39.098	-13.00
	10	782.0	3.6661	27.976	-67.178	-39.202	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 52 ~ 55.

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(26.5)	30.131

8.5 BAND EDGE

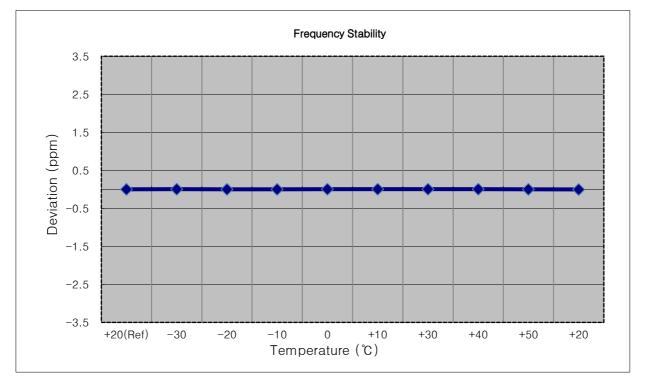
- Plots of the EUT's Band Edge are shown Page 32 ~ 43.



8.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>779,500,000 Hz</u>
CHANNEL:	<u>23205 (5 MHz)</u>
REFERENCE VOLTAGE:	4.200 VDC
DEVIATION LIMIT:	Emission must remain in band

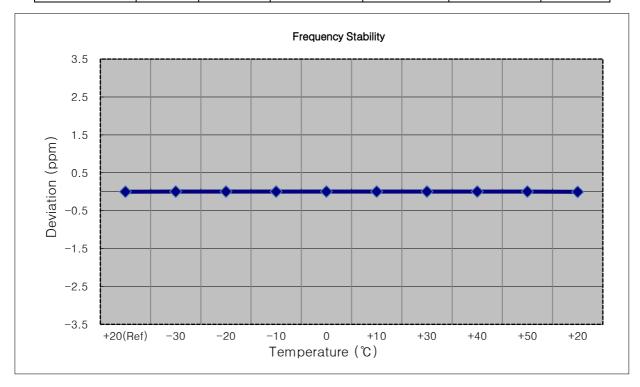
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	779 500 002	0.00	0.000 000	0.0000
100%		-30	779 500 005	2.10	0.000 000	0.0027
100%		-20	779 500 004	1.60	0.000 000	0.0021
100%		-10	779 500 001	-1.30	0.000 000	-0.0017
100%	4.200	0	779 500 006	3.10	0.000 000	0.0040
100%		+10	779 500 005	2.70	0.000 000	0.0035
100%		+30	779 500 005	2.10	0.000 000	0.0027
100%		+40	779 500 005	2.40	0.000 000	0.0031
100%		+50	779 500 004	1.60	0.000 000	0.0021
Batt. Endpoint	3.400	+20	779 500 000	-2.10	0.000 000	-0.0027





MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>782,000,000 Hz</u>
CHANNEL:	<u>23230 (5 MHz)</u>
REFERENCE VOLTAGE:	4.200 VDC
DEVIATION LIMIT:	Emission must remain in band

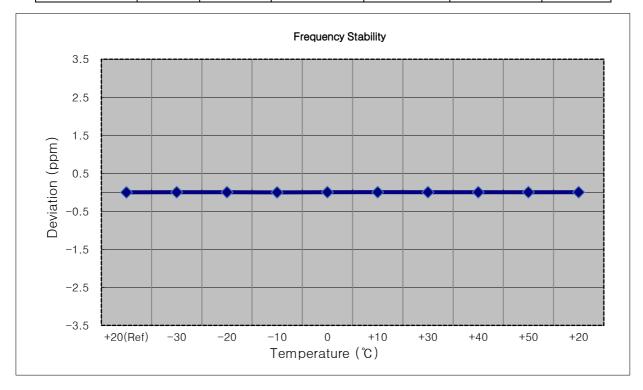
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	782 000 002	0.00	0.000 000	0.0000
100%		-30	782 000 004	2.10	0.000 000	0.0027
100%		-20	782 000 003	1.90	0.000 000	0.0024
100%		-10	782 000 004	2.30	0.000 000	0.0029
100%	4.200	0	782 000 004	2.20	0.000 000	0.0028
100%		+10	782 000 004	2.20	0.000 000	0.0028
100%		+30	782 000 004	2.50	0.000 000	0.0032
100%		+40	782 000 004	2.60	0.000 000	0.0033
100%		+50	782 000 004	2.60	0.000 000	0.0033
Batt. Endpoint	3.400	+20	781 999 999	-2.20	0.000 000	-0.0028





MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>784,500,000 Hz</u>
CHANNEL:	<u>23255 (5 MHz)</u>
REFERENCE VOLTAGE:	4.200 VDC
DEVIATION LIMIT:	Emission must remain in band

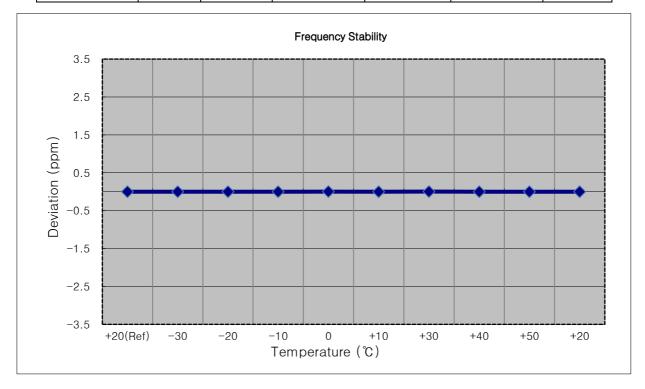
Voltage	Power	Temp.	Frequency	Frequency	Deviation	
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	ppm
100%		+20(Ref)	784 499 999	0.00	0.000 000	0.0000
100%		-30	784 500 000	1.30	0.000 000	0.0017
100%		-20	784 500 002	3.20	0.000 000	0.0041
100%		-10	784 499 997	-1.80	0.000 000	-0.0023
100%	4.200	0	784 500 001	2.70	0.000 000	0.0034
100%		+10	784 500 002	3.30	0.000 000	0.0042
100%		+30	784 500 000	1.70	0.000 000	0.0022
100%		+40	784 500 002	3.20	0.000 000	0.0041
100%		+50	784 500 000	1.50	0.000 000	0.0019
Batt. Endpoint	3.400	+20	784 500 002	3.00	0.000 000	0.0038





MODE:	<u>LTE 13</u>
OPERATING FREQUENCY:	<u>782,000,000 Hz</u>
CHANNEL:	<u>23230 (10 MHz)</u>
REFERENCE VOLTAGE:	4.200 VDC
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	0.70	0.000 000	0.0009
100%		-20	782 000 003	1.10	0.000 000	0.0014
100%		-10	782 000 001	-0.70	0.000 000	-0.0009
100%	4.200	0	782 000 003	1.40	0.000 000	0.0018
100%		+10	782 000 003	1.10	0.000 000	0.0014
100%		+30	782 000 003	1.30	0.000 000	0.0017
100%		+40	782 000 003	1.10	0.000 000	0.0014
100%		+50	782 000 000	-1.00	0.000 000	-0.0013
Batt. Endpoint	3.400	+20	782 000 003	1.10	0.000 000	0.0014





FCC ID: A3LSMA146M

9. TEST PLOTS



💓 Agilent Spec	ctrum Analyzer - Swept SA RF 50 Ω AC		SENSE:INT	ALIGN	AUTO 10:21:14 PM Sep 2	9,2022
	req 776.00000) MHz		#Avg Type: RM	S TRACE	Frequency
		PNO: Wide ↔→ IFGain:Low	#Atten: 20 dB			
	Ref Offset 26.7 dB				Mkr1 775.960	Auto Tune
10 dB/div Log	Ref 26.70 dBm				-37.270 d	BM
						Center Freq
16.7						776.000000 MHz
6.70						Start Freq
						772.000000 MHz
-3.30						172.000000 Mil 12
-13.3					-13	00 dBm
-13.3						Stop Freq
-23.3						780.000000 MHz
-33.3			1			CF Step 800.000 kHz
		a star and a star	warran and a start and a start and a start and a start			Auto Man
-43.3		Barry and a state of the state				
- farmer						Freq Offset
-53.3						0 Hz
-63.3						
	6.000 MHz				Span 8.000	MHz
#Res BW	100 kHz	#VBW	300 kHz		veep 1.000 s (1001	pts)
MSG				1 0	STATUS	

5 M_BandEdge_Lowest Channel_QPSK_FullRB(1)



							trum Analyzer - Sw	
Frequency	10:21:33 PM Sep 29, 2022 TRACE 1 2 3 4 5 6	ALIGN AUTO			Hz	Ω AC DOOOO MH	RF 50 req 769.00	Center F
				Trig: Free #Atten: 20	PNO: Wide ↔→ IFGain:Low	-	-	
Auto Tune	1 774.964 MHz -47.812 dBm		Ref Offset 26.7 dB 0 dB/div Ref -10.00 dBm					
Center Freq 769.000000 MHz								-20.0
Start Freq 763.000000 MHz								-30.0
Stop Freq 775.000000 MHz	RMA	and the state of t						-50.0
CF Step 1.200000 MHz <u>Auto</u> Man		WAR	ramitalian jetengkal	heranter (Nederad)	474420000 Albertage	สมน _ี มีราชมีกระบทรงกระบ	~yysystemetronerat	-70.0
Freq Offset 0 Hz								-80.0
	Stop 775.000 MHz							-100 Start 763
	1.000 s (1001 pts)	#Sweep		30 kHz	#VBW		10 kHz	#Res BW

5 M_BandEdge_Lowest Channel_QPSK_FullRB(2)



PNO: Wide IFGain:Low Trig: Free Run #Atten: 20 dB Trig: Avay Type: Run Det AAAAAA Ref Offset 26.7 dB 10 dB/div Ref 26.70 dBm Avay Type: Run #Atten: 20 dB Avay Type: Run Pet AAAAAA Avay Type: Run Pet AAAAAAA Avay Type: Run Pet AAAAAAA Avay Type: Run Pet AAAAAAA Avay Type: Run Pet AAAAAAA Avay Type: Run Pet AAAAAAAA Avay Type: Run Pet AAAAAAA Avay Type: Run Pet AAAAAAAA Avay Type: Run Pet AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	uency uto Tune nter Freg
PNO: Wide → Trig: Free Run IFGain:Low #Atten: 20 dB Ref Offset 26.7 dB 10 dB/div Ref 26.70 dBm Log AAAAAA	
Ref Offset 26.7 dB Mkr1 788.088 MHz A 10 dB/div Ref 26.70 dBm -34.456 dBm A	
	nton Engra
	mer Fred
	00000 MHz
	Start Freq
794.0	00000 MHz
-3.30	
-13.3	
	Stop Freq 00000 MHz
-23.3	
	05.04++
-33.3	CF Step 00.000 kHz
	Man
-53.3	eq Offset
	0 Hz
-63.3	
Center 788.000 MHz Span 8.000 MHz	
Center 788.000 MHz Span 8.000 MHz #Res BW 100 kHz #VBW 300 kHz #Sweep 1.000 s (1001 pts)	
MSG STATUS	

5 M_BandEdge_Highest Channel_QPSK_FullRB(1)



	trum Analyzer - Swept SA					
LXI RL	RF 50 Ω AC req 799.000000	MHa	SENSE:INT	ALIGN AUTO #Avg Type: RMS	10:26:15 PM Sep 29, 2022 TRACE 1 2 3 4 5 6	Frequency
Center F	req 799.000000	PNO: Wide +	Trig: Free Run	mitg type. this		
		IFGain:Low	#Atten: 20 dB		,	Auto Tune
	Ref Offset 26.7 dB			MK	r1 793.204 MHz -57.202 dBm	Auto Func
10 dB/div Log	Ref -10.00 dBm	1			-57.202 UBII	
						Center Freq
-20.0						799.000000 MHz
-30.0						
					-35.00 dBm	Start Freq
-40.0						793.000000 MHz
-50.0						Stop Freq
∳'						805.000000 MHz
-60.0	and a low and a second s					
	Contra Paper	and a start of the second s	how where the state of the stat	**************************************	RMS	CE Stop
-70.0						CF Step 1.200000 MHz
						<u>Auto</u> Man
-80.0						
						Freq Offset
-90.0						0 Hz
-100						
Start 793.	000 MHz				Stop 805.000 MHz	
#Res BW		#VBW	30 kHz	#Sweep	1.000 s (1001 pts)	
MSG						
				3		

5 M_BandEdge_Highest Channel_QPSK_FullRB(2)



							t SA	trum Analyzer - Swep	
Frequency	10:21:58 PM Sep 29, 2022 TRACE 1 2 3 4 5 6	ALIGN AUTO	#Avg Ty	NSE:INT	SEN	11_		RF 50 Ω	X/RL
	DET A A A A A A		#r.vg iy		Trig: Free #Atten: 20	PNO: Wide ↔→ IFGain:Low		eq 776.000	Center F
Auto Tune	1 776.000 MHz -41.977 dBm	Mkı						Ref Offset 26. Ref 26.70 d	10 dB/div Log
Center Freq 776.000000 MHz									16.7
Start Freq 772.000000 MHz									-3.30
Stop Freq 780.000000 MHz	-13.00 dBm								-13.3
CF Step 800.000 kHz <u>Auto</u> Man	RMS			1					-33.3
Freq Offset 0 Hz					\sim				-53.3
	Span 8.000 MHz							6.000 MHz	
	1.000 s (1001 pts)	#Sweep			300 kHz	#VBW		100 KHZ	#Res BW

5 M_BandEdge_Lowest Channel_QPSK_1RB



🗾 Agilent Spectrum Analyzer - Swept SA 🚽					
RL RF 50 Ω AC Center Freq 788.000000	MHz	SENSE:INT	ALIGN AUTO #Avg Type: RMS	10:26:42 PM Sep 29, 2022 TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide ↔→ IFGain:Low	Trig: Free Run #Atten: 20 dB	0 ,1		
		WAtten: 20 db	Mk	r1 788.016 MHz	Auto Tune
Ref Offset 26.7 dB 10 dB/div Ref 26.70 dBm				-42.027 dBm	
					Center Freq
16.7					788.000000 MHz
6.70					Start Freq
-3.30					784.000000 MHz
				-13.00 dBm	
-13.3					Stop Freq 792.000000 MHz
-23.3		\			CF Step
-43.3		1 1			800.000 kHz <u>Auto</u> Man
and the second s				RMS	Erog Offect
-53.3					Freq Offset 0 Hz
-63.3					
Center 788.000 MHz #Res BW 100 kHz	#VBW	300 kHz	#Sweep	Span 8.000 MHz 1.000 s (1001 pts)	
MSG				3	

5 M_BandEdge_Highest Channel_QPSK_1RB



	trum Analyzer - Swept										
Center E	RF 50 Ω req 776.000		-17	SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS		M Sep 29, 2022	F	requency
Center P			PNO: Wide	Trig: Free				TY			
			IFGain:Low	#Atten: 20) aB						Auto Tune
	Ref Offset 26.7	7_dB					MK	20 0	04 MHz 30 dBm		/ are rane
10 dB/div Log	Ref 26.70 d	Bm						-30.0	SU UBIII		
											Center Freq
16.7											6.000000 MHz
6.70											
						1			RMS		Start Freq
-3.30										77	2.000000 MHz
-13.3									-13.00 dBm		Stop Freq
										78	0.000000 MHz
-23.3										10	0.000000 11112
						and the second					
-33.3					1	al a change and a					CF Step 800.000 kHz
			- Andrew Construction							Auto	Man
-43.3	A A A A A A A A A A A A A A A A A A A	مريد الدي المريد ال									
-53.3											Freq Offset 0 Hz
											0 H2
-63.3											
Contor 77	6 000 MILL-							Cnor 0			
Center 77 #Res BW	6.000 MHz 100 kHz		#VBM	300 kHz			#Sween	5pan 8	.000 MHz (1001 pts)		
MSG			# 6 E) 66	000 1112			STATUS		reo r ptoj		
Mag							STATUS				

10 M_BandEdge_Mid Channel(Lower)_QPSK_FullRB(1)



	trum Analyzer - Swept SA									×
	RF 50 Ω AC req 769.000000		SENS	E:INT	#Avg Typ	ALIGN AUTO		M Sep 29, 2022 E 1 2 3 4 5 6	Frequency	У
Center F	req 709.00000	PNO: Wide 中	Trig: Free				TYF			
		IFGain:Low	#Atten: 20	dB					Auto T	Tune
	Ref Offset 26.7 dB					MK	1 //4.9	40 MHz 39 dBm		and
10 dB/div Log	Ref -10.00 dBm	1					-40.2	59 UBIII		
									Center	Frea
-20.0									769.000000	
-30.0										
								-35.00 dBm	Start	
-40.0									763.000000	MHz
								RM		
-50.0							And an in the local of the second	manufatant	Stop I	Freq
						Mar Marthall	Are and the provide states of the		775.000000	
-60.0					and the second second					
Marthan	menenentalephilippinganelan	₽₩₽₽₩₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	heat-le-wheeter	๛๚๛๛๛๛๛๛๚๛	along/Hall				CES	Step
-70.0									1.200000	
									Auto	Man
-80.0										
									Freq O	ffset
-90.0										0 Hz
-100										
-100										
Start 763.							Stop 775	.000 MHz		
#Res BW	10 KHZ	#VBW	30 kHz					1001 pts)		
MSG						I STATUS				

10 M_BandEdge_Mid Channel(Lower)_QPSK_FullRB(2)



	ctrum Analyzer - Swept SA					
LXI RL	RF 50 Ω AC req 788.000000		SENSE:INT	ALIGN AUTO #Avg Type: RMS	10:31:49 PM Sep 29, 2022 TRACE 1 2 3 4 5 6	Frequency
Center F	req 788.000000	PNO: Wide +++	Trig: Free Run	#Avg Type. Kino		
		IFGain:Low	#Atten: 20 dB			Auto Tune
	Ref Offset 26.7 dB			Mk	r1 788.168 MHz	Autorune
10 dB/div Log	Ref 26.70 dBm				-36.824 dBm	
- V9						Center Freq
16.7						788.000000 MHz
10.1						788.000000 IVIH2
6.70						
						Start Freq
-3.30						784.000000 MHz
3.30						
-13.3					-13.00 dBm	
10.0						Stop Freq
-23.3						792.000000 MHz
20.0		June 1				
-33.3		Marage.	<u>1_</u>			CF Step
00.0			The state of the second of the	1-4-way and an international and an and an and an	RMS	800.000 kHz Auto Man
-43.3					and a start and a start and a start a s	<u>Auto</u> Man
-53.3						Freq Offset
						0 Hz
-63.3						
	88.000 MHz				Span 8.000 MHz	
#Res BW	100 kHz	#VBW	300 kHz		1.000 s (1001 pts)	
MSG					3	

10 M_BandEdge_Mid Channel(Higher)_QPSK_FullRB(1)



	ctrum Analyzer - Swep	t SA									
Contor E	RF 50 Ω req 799.000		7	SEN	ISE:INT	#Avg Type	ALIGN AUTO		M Sep 29, 2022	Fi	requency
Center	req 733.000	-	PNO: Wide 🛏	Trig: Free				TYF			
		l	FGain:Low	#Atten: 2	Jab		M		-		Auto Tune
	Ref Offset 26.						IVIK	-50 9	96 MHz 03 dBm		
10 dB/div Log	Ref -10.00 (авт						-00.0			
										(Center Freq
-20.0											.000000 MHz
-30.0											Otherst English
									-35.00 dBm	703	Start Freq 3.000000 MHz
-40.0										790	
1											
-50.0	Mar Annu La										Stop Freq
		h.								805	5.000000 MHz
-60.0		- ANTONIA	Holy have no agreed by the second	hutup any wheat an and					PMS		
-70.0				a construction of the second	Berty way and	๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	nhannyanyahah	และเราการ	ajayaraser waaraa		CF Step
-70.0											.200000 MHz
-80.0										<u>Auto</u>	Man
00.0											
-90.0											Freq Offset
											0 Hz
-100											
								.	000 8411-		
Start 793. #Res BW			#VRM	30 kHz			#Sween	Stop 805	.000 MHz 1001 pts)		
	TV MHZ		<i></i>	50 MHZ			status		roor pts)		
Wog							No STATUS				

10 M_BandEdge_Mid Channel(Higher)_QPSK_FullRB(2)



🎉 Agilent Spectrum Analyzer - Sw										
Center Freq 776.00		7	SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Sep 29, 2022 E 1 2 3 4 5 6		Frequency
	Р	NO: Wide +++ Gain:Low	Trig: Free #Atten: 20				TYF DE			
Ref Offset 2 10 dB/div Ref 26.70	6.7 dB d Bm					Mkı	1 775.9 -45.7	44 MHz 93 dBm		Auto Tune
16.7									7	Center Freq 76.000000 MHz
-3.30									7	Start Freq 72.000000 MHz
-13.3								-13.00 dBm	7	Stop Freq B0.000000 MHz
-33.3				1 _	~				<u>Auto</u>	CF Step 800.000 kHz Man
-53.3			~~~					RMS		Freq Offset 0 Hz
Center 776.000 MHz #Res BW 100 kHz		#\/B\/	300 kHz			#Sween	Span 8	.000 MHz 1001 pts)		
MSG			000 MIIZ					1001 pt3)		

10 M_BandEdge_Mid Channel(Lower)_QPSK_1RB



	ctrum Analyzer - Swept										
🗶 RL	RF 50 Ω req 788.000		,	SE	NSE:INT	#Avg Ty	ALIGN AUTO		M Sep 29, 2022	F	requency
Center F	req 788.000	PN	IO: Wide 🔸	. Trig: Fre				TYP			
		IFC	Gain:Low	#Atten: 2	0 dB						Auto Tune
	Ref Offset 26.7	7_dB					MK	r1 /90.8	40 MHz 17 dBm		Auto Tune
10 dB/div Log	Ref 26.70 d	Bm						-40.0	п чып		
		,	x								Center Freq
16.7		{	}								B.000000 MHz
6.70											
0.70											Start Freq
-3.30										78	4.000000 MHz
0.00]	l l								
-13.3			<u> </u>						-13.00 dBm		01
-23.3										79:	Stop Freq 2.000000 MHz
-23.3			L L								CF Step
-33.3		m		.							800.000 kHz
-43.3	-							▲1		<u>Auto</u>	Man
-43.3	~~~			- V					RMS		
-53.3						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		teres and the			Freq Offset
-33.3											0 Hz
-63.3											
Center 78	8.000 MHz							Span 8	.000 MHz		
#Res BW			#VBW	300 kHz			#Sweep	1.000 s (1001 pts)		
MSG								3			

10 M_BandEdge_Mid Channel(Higher)_QPSK_1RB



Mailent Spectrum Analyzer - Occupied BW						
RL RF 50 Ω AC Center Freq 782.000000 Γ <thγ< td=""><td>MHz</td><td>SENSE:INT</td><td></td><td></td><td>:24:11 PM Sep 29, 2022 io Std: None</td><td>Frequency</td></thγ<>	MHz	SENSE:INT			:24:11 PM Sep 29, 2022 io Std: None	Frequency
PASS	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold: 5		io Device: BTS	
,		#Atten: 20 db		1\du	bevice. B13	
Ref Offset 26.7 dl 10 dB/div Ref 40.00 dBn						
Log						Our tran Error
30.0						Center Freq 782.000000 MHz
20.0	mmmmmm.	m m h	m			782.000000 14112
10.0						
0.00				- <u>}</u>		
-10.0				ha		
-20.0					l conce a	
-30.0 mm mm Mm M					han	
-40.0						
-50.0						05.04+*
						CF Step 1.000000 MHz
Center 782 MHz #Res BW 100 kHz		#VBW 390			Span 10 MHz Sweep 1 ms	<u>Auto</u> Man
#Res DW TOURNZ		#4044 390	KIIZ		Sweep Tins	
Occupied Bandwidt	h	Total F	Power	31.0 dB	m	Freq Offset
4.	5196 MH	lz				0 Hz
Transmit Freq Error	26.709 k	Hz OBW F	Power	99.00	%	
x dB Bandwidth	5.268 M	Hz x dB		-26.00 d	В	
MSG						

5 M_OBW_Mid Channel_QPSK_FullRB



Agilent Spectrum Analyzer - Occupied BW							
IX RL RF 50 Ω AC Center Freq 782.000000 M		SENSE:INT Center Freq: 782.00		IGN AUTO	10:23:13 PI Radio Std:	M Sep 29, 2022 None	Frequency
PASS		Total France Brand	Avg Hold: 5	00/500	Radio Devi	DTC	
	#IFGain:Low	#Atten: 20 dB			Radio Devi	Ce: BIS	
Ref Offset 26.7 dE				_			
Log 30.0							Center Freq
20.0							782.000000 MHz
10.0	mon	www.when	mm	\sim			
0.00	/						
-10.0	r			Jon Star			
				have a			
-20.0					\sim	www.	
-30.0							
-40.0							
-50.0							CF Step
Center 782 MHz							1.000000 MHz
#Res BW 100 kHz		#VBW 390	kHz			n 10 MHz ep 1 ms	<u>Auto</u> Man
Occupied Bandwidt	h	Total F	Power	29.9	dBm		Freq Offset
4.	5140 MH	IZ					0 Hz
Transmit Freq Error	17.455 k	Hz OBW F	ower	99.	00 %		
x dB Bandwidth	5.339 M	Hz x dB		-26.0	0 dB		
MSG				STATUS			
						_	

5 M_OBW_Mid Channel_16QAM_FullRB



Ji Agilent Spectrum Analyzer - Occupied BW							
K RL RF 50 Ω AC Center Freq 782.000000		SENSE:INT Center Freq: 782.00		ALIGN AUTO	10:23:38 PM Sep 2 Radio Std: None		Frequency
PASS		Trig: Free Run	Avg Hold:	500/500			
FASS	#IFGain:Low	#Atten: 20 dB			Radio Device: B	TS	
Ref Offset 26.7 de 10 dB/div Ref 40.00 dBm							
30.0							Center Freq
20.0							782.000000 MHz
10.0		᠆ᡔ᠆ᠯᢦᠧᡔᠰᠬᡊᡢ᠘᠇ᢪᢦᢑᡗᠰ᠆ᠬ	www.www.	27			
				X			
0.00				1			
-10.0				- W			
-20.0				<u>بر</u>	alantan www.		
-20.0 -30.0						www.	
-40.0							
-50.0							
-50.0							CF Step 1.000000 MHz
Center 782 MHz					Span 10	MHz A	uto Man
#Res BW 100 kHz		#VBW 390	kHz		Sweep		
Occupied Bandwidt	h	Total I	Power	28.8	dBm		Freq Offset
4.	5303 MH	z					0 Hz
Transmit Freq Error	22.932 k	Hz OBW F	Power	99	.00 %		
x dB Bandwidth	5.283 M	Hz x dB		-26.	00 dB		
100				1			
MSG					5		

5 M_OBW_Mid Channel_64QAM_FullRB



Agilent Spectrum Analyzer - Occupied BW					
IX RL RF 50 Ω AC Center Freq 782.000000 Ν PASS	ни <u>с</u> ны Т	SENSE:INT Senter Freq: 782.000000 MHz rig: Free Run Avg H Atten: 20 dB	ALIGN AUTO old: 500/500	10:34:41 PM Sep 29, 2022 Radio Std: None Radio Device: BTS	Frequency
Ref Offset 26.7 dB 10 dB/div Ref 40.00 dBm					
30.0 20.0					Center Freq 782.000000 MHz
10.0		mar how many a	man h		
-10.0 -20.0 -30.0				mar Calaria and a call	
-40.0					CF Step
Center 782 MHz #Res BW 100 kHz		#VBW 390 kHz		Span 10 MHz Sweep 1 ms	1.000000 MHz
Occupied Bandwidth	ո 5030 MHz	Total Power	26.9	dBm	Freq Offset 0 Hz
Transmit Freq Error	17.089 kHz	OBW Power	99	.00 %	
x dB Bandwidth	5.308 MHz	x dB	-26.0	00 dB	
MSG					

5 M_OBW_Mid Channel_256QAM_FullRB



🔰 Agilent Spectrum Analyzer - Occupied BW							
RL RF 50 Ω AC Center Freq 782.000000 Λ	ЛН౽	SENSE:INT	0000 MHz	ALIGN AUTO	10:30:34 PM Radio Std:	1 Sep 29, 2022 None	Frequency
PASS	+	Trig: Free Run #Atten: 20 dB	Avg Hold	: 500/500	Radio Devid	AN BTS	
	#IFGain:Low	#Atten: 20 dB			Radio Devic	Ce. DTS	
Ref Offset 26.7 dB 10 dB/div Ref 40.00 dBm Log							
30.0							Center Freq
20.0							782.000000 MHz
	and when were	man and a grand and a second	ᢇ᠆ᠰ᠋ᢆᢦ᠕ᡁᡃᢛᠰᢩᠺᡁᠬ	the second			
10.0							
0.00	(1			
-10.0				- <u>'</u>			
-20.0				<u>لا</u> ال	᠕ᠰᠬ᠇ᡢ᠕ᡀ᠕ᡁᠬ		
-20.0 -30.0 when the hard the west that					and a self-out.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-40.0							
-50.0							
-30.0							CF Step 2.000000 MHz
Center 782 MHz		·			Spar		Auto Man
#Res BW 200 kHz		#VBW 820	kHz		Swee	ep 1 ms	
Occupied Bandwidt	h	Total	Power	31.0	dBm		Freq Offset
	9669 MH	łz					0 Hz
Transmit Freq Error	17.033 k	Hz OBW I	Power	99	.00 %		
x dB Bandwidth	10.10 M	Hz x dB		-26.	00 dB		
NGO				I STATUS			
MSG				IN STATUS			

10 M_OBW_Mid Channel_QPSK_FullRB



Magilent Spectrum Analyzer - Occupied BW							
X RL RF 50 Ω AC Center Freq 782.000000 Μ PASS	A Hz #IFGain:Low	SENSE:INT Center Freq: 782.000 Trig: Free Run #Atten: 20 dB		LIGN AUTO	10:29:38 PM Radio Std: Radio Devic		Frequency
Ref Offset 26.7 dE 10 dB/div Ref 40.00 dBm							
30.0 20.0							Center Freq 782.000000 MHz
0.00	Manna	m. Alfrenzeler det al al	May Markan Marka				
-10.0 -20.0 -30.0					haly malay m		
-30.0							CF Step
Center 782 MHz #Res BW 200 kHz		#VBW 8201	(Hz			n 20 MHz ep 1 ms	2.000000 MHz
Occupied Bandwidt	ո 9974 MH	Total P	ower	30.0	dBm		Freq Offset 0 Hz
Transmit Freq Error	18.136 kl	Hz OBW P	ower	99	.00 %		
x dB Bandwidth	10.20 MI	Hz x dB		-26.0	00 dB		
MSG				STATUS			

10 M_OBW_Mid Channel_16QAM_FullRB



J Agilent Spectrum Analyzer - Occupied B RL RF 50 Ω AC	W	SENSE:IN	T	ALIGN AUTO	10:20:01 0	M Sep 20, 2022	
Center Freq 782.000000	MHz	Center Freq: 7	82.000000 MHz	d: 500/500	Radio Std:	M Sep 29, 2022 None	Frequency
PASS	#IFGain:Low	#Atten: 20 dB	, trainer	4. 000/000	Radio Dev	ice: BTS	
Ref Offset 26.7 10 dB/div Ref 40.00 dB							
30.0 20.0							Center Fred 782.000000 MHz
10.0	Annon	withoran your Mary	Muchan	m			
0.00				<mark>\</mark>			
-10.0	v						
-20.0					1 mart Manual 1	What was how	
-30.0 <mark>1/140/140/140/140/140/140/140/140/140/14</mark>						47	
-40.0							
-50.0							CF Step 2.000000 MHz
Center 782 MHz #Res BW 200 kHz		#VBW	820 kHz			n 20 MHz ep 1 ms	<u>Auto</u> Man
Occupied Bandwid	lth	То	tal Power	29.9	dBm		Freq Offset
8	.9961 MI	Ηz					0 Hz
Transmit Freq Error	19.995 I	(Hz OB	W Power	99	9.00 %		
x dB Bandwidth 10.49 MHz		IHz x d	x dB -26		-26.00 dB		
MSG				I o statu	s		

10 M_OBW_Mid Channel_64QAM_FullRB



Agilent Spectrum Analyzer - Occupied BW							
X RL RF 50 Ω AC A	MHz #IFGain:Low	SENSE:INT Center Freq: 782. Trig: Free Run #Atten: 20 dB		ALIGN AUTO	Radio Std: Radio Devi		Frequency
Ref Offset 26.7 df 10 dB/div Ref 40.00 dBn							
30.0 20.0							Center Freq 782.000000 MHz
0.00	para para mana	_{կուրդ} ը, _{երգ} իչեմ է _{ու} Խ _Ն սն-Դարոն է	ᠰ᠋ᡧᠮᡮᠯᡊᢇᡅ				
-10.0 -20.0 -30.0				- M. Market	1mm WWW	m hoursey	
-40.0							CF Step 2.000000 MHz
Center 782 MHz #Res BW 200 kHz		#VBW 82	0 kHz		Spai Swe	n 20 MHz ep 1 ms	<u>Auto</u> Man
Occupied Bandwidt 8.	^h 9729 MI		Power	26.8	3 dBm		Freq Offset 0 Hz
Transmit Freq Error	22.702	(Hz OBW	Power	99	.00 %		
x dB Bandwidth	10.23 N	IHz x dB		-26.	00 dB		
MSG					5		

10 M_OBW_Mid Channel_256QAM_FullRB



	um Analyzer - Swept SA							
	RF 50 Ω AC eq 5.01500000	0 GHz	SENSE:		ALIGN AUTO		4 Sep 29, 2022	Frequency
	04 0.0 1000000	PNO: Fast ↔ IFGain:Low	Trig: Free Ru #Atten: 20 df			TYP		
		IFGain:Low	#Atten: 20 di	, 	ML	r1 3.703		Auto Tune
10 dB/div	Ref 10.00 dBm				IVIN	-67.09	0 dBm	
	^ ²							
0.00	?⁻├─── ├──							Center Freq
-10.0								5.015000000 GHz
-20.0								
-30.0								Start Freq
-40.0								30.000000 MHz
-50.0								
-60.0		1					RMS	Stop Freq
-70.0		and the second s					Kivis	10.000000000 GHz
-80.0								
Start 30 MI	H7					Stop 10	000 GHz	CF Step
#Res BW 1		#VBV	V 3.0 MHz		Sweep 17	.33 ms (2)	0001 pts)	997.000000 MHz
MKR MODE TRC	SCL >	(Y	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE	<u>Auto</u> Man
1 N 1 2 N 1	f	3.703 9 GHz 777.8 MHz	-67.090 dBm -4.471 dBm					
3			-4.47 I UDIII					Freq Offset
4 5							=	0 Hz
6								
8								
9 10								
11							+	
MSG						3		

5 M_CSE(30 M-10 G)_Lowest Channel_QPSK_1RB



	trum Analyzer -	•								
Center Fr		50 Ω AC	CH2	SEN	SE:INT	#Avg Typ	ALIGN AUTO		M Sep 29, 2022	Frequency
Center Pr	eq 5.01	000000	PNO: Fast +	Trig: Free				TYF		
			IFGain:Low	#Atten: 20	dB					Auto Tun
							MI	r1 3.71	1 9 GHz 92 dBm	
10 dB/div Log	Ref 10.0	00 dBm						-07.18	92 UBM	
0.00										Center Fre
-10.0	<u> </u>									5.015000000 GH
-20.0										
-30.0										
-40.0										Start Fre
-50.0										30.000000 MH
-60.0				1						
						م بعقه بع			RMS	Stop Fre
-70.0										10.00000000 GH
-80.0										
Start 30 M	1Hz							Stop 10	.000 GHz	CF Ste
#Res BW	1.0 MHz		#VB	W 3.0 MHz		s	weep 17	.33 ms (2	0001 pts)	997.000000 MH
MKR MODE TR	C SCL	X		Y		CTION FU	NCTION WIDTH	FUNCTIO	DN VALUE	Auto Ma
1 N 1 2 N 1	f		711 9 GHz 780.2 MHz	-67.192 dB -4.431 dB	m					
3			00.2 141112	-4.401 02						Freq Offse
4 5									=	ОН
6										
8										
9										
11									~	
				m					•	
MSG							UN STATUS			

5 M_CSE(30 M-10 G)_Mid Channel_QPSK_1RB



📁 Agilent Spectrum Analyzer - Swept SA							
₩ RL RF 50 Ω AC Center Freq 5.015000000	CH2	SENSE:I		ALIGN AUTO		4 Sep 29, 2022	Frequency
Center Fred 5.015000000	PNO: Fast ++	Trig: Free Ru	n	, , , , , , , , , , , , , , , , , , , ,	TYP		
	IFGain:Low	#Atten: 20 dB	i				Auto Tune
				MK	r1 3.698	0 GHz 4 dBm	riato rano
10 dB/div Ref 10.00 dBm					-07.07	4 abm	
							Center Freq
-10.0							5.015000000 GHz
-20.0							
-30.0							
-40.0							Start Freq
							30.000000 MHz
-50.0	. 1						
-60.0						RMS	Stop Freq
-70.0	the second s						10.00000000 GHz
-80.0							
Start 30 MHz					Stop 10	000 GHz	CF Step
#Res BW 1.0 MHz	#VBW	3.0 MHz		Sweep 17	.33 ms (20	0001 pts)	997.000000 MHz
MKRI MODEI TRCI SCLI X		Y	FUNCTION	FUNCTION WIDTH	FUNCTIO		<u>Auto</u> Man
1 N 1 f 3.	698 0 GHz	-67.074 dBm	1 on on on		10110110		
2 N 1 f	787.2 MHz	-4.396 dBm					Freq Offset
4							0 Hz
5						=	
7							
9							
10							
		III				•	
MSG					5		

5 M_CSE(30 M-10 G)_Highest Channel_QPSK_1RB



	trum Analyzer - Swept SA							
(X/ RL Center Er	RF 50 Ω AC req 5.01500000		SENSE		ALIGN AUTO		M Sep 29, 2022	Frequency
Genter II	1000000	PNO: Fast ↔ IFGain:Low	Trig: Free R #Atten: 20 d	un	•	TYF		
		II Gam.cow			ML	(r1 3.66	1 GH7	Auto Tune
10 dB/div	Ref 10.00 dBm					-67.1	78 dBm	
Log	∕ <mark>2</mark>							
0.00	Y							Center Freq
-10.0								5.015000000 GHz
-20.0								
-30.0								Start Freq
-40.0								30.000000 MHz
-50.0		. 1						
-60.0		· · · · · · · · · · · · · · · · · · ·					RMS	Stop Freq
-70.0								10.00000000 GHz
-80.0								
Start 30 N					·	Stop 10	.000 GHz	CF Step
#Res BW	1.0 MHz	#VBV	V 3.0 MHz		Sweep 17	'.33 ms (2	0001 pts)	997.000000 MHz Auto Man
MKR MODE TR		· · · · · · · · · · · · · · · · · · ·	Y	FUNCTION	FUNCTION WIDTH	FUNCTIO	ON VALUE	Auto
1 N 1 2 N 1		3.666 1 GHz 778.2 MHz	-67.178 dBm -3.896 dBm					Ener Offerst
3 4							-	Freq Offset 0 Hz
5							=	0112
7								
8							_	
10								
•			III				F I	
MSG						s		

10 M_CSE(30 M-10 G)_Mid Channel_QPSK_1RB



10. APPENDIX A_ TEST SETUP PHOTO

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

Ν	No.	Description
	1	HCT-RF-2211-FC034-P