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FCC Carrier Aggregation REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

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

Date of Issue:
May 13, 2022

Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-2205-FC045

FCC ID:	**A3LSMG990U2**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s):	SM-G990U2
Additional Model(s):	SM-G990U3/DS
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2

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)

Mode (PCC+SCC)	Tx Frequency (MHz)	Modulation	Emission Designator	EIRP	
				Max. Power (dBm)	Max. Power (W)
10 MHz+15 MHz	1715.3 - 1772.5	QPSK	23M2G7D	22.85	0.193
		16QAM	23M1W7D	22.21	0.166
		64QAM	23M0W7D	19.43	0.088
		256QAM	23M1W7D	18.48	0.071
15 MHz+10 MHz	1717.5 - 1774.7	QPSK	23M0G7D	22.51	0.178
		16QAM	23M1W7D	22.05	0.160
		64QAM	23M1W7D	19.23	0.084
		256QAM	23M1W7D	18.17	0.066
10 MHz+20 MHz	1715.5 - 1770.0	QPSK	27M7G7D	22.84	0.192
		16QAM	27M7W7D	22.12	0.163
		64QAM	27M6W7D	19.51	0.089
		256QAM	27M7W7D	18.35	0.068
20 MHz+10 MHz	1720.0 - 1774.5	QPSK	27M9G7D	22.62	0.183
		16QAM	27M8W7D	22.13	0.163
		64QAM	27M7W7D	19.46	0.088
		256QAM	27M7W7D	18.02	0.063
15 MHz+15 MHz	1717.5 - 1772.5	QPSK	28M3G7D	22.67	0.185
		16QAM	28M3W7D	22.01	0.159
		64QAM	28M3W7D	19.38	0.087
		256QAM	28M3W7D	18.18	0.066
15 MHz+20 MHz	1717.8 - 1770.0	QPSK	32M5G7D	22.83	0.192
		16QAM	32M6W7D	22.20	0.166
		64QAM	32M5W7D	19.48	0.089
		256QAM	32M5W7D	18.11	0.065
20 MHz+15 MHz	1720.0 - 1772.2	QPSK	32M7G7D	22.60	0.182
		16QAM	32M6W7D	22.15	0.164
		64QAM	32M5W7D	19.44	0.088
		256QAM	32M6W7D	18.41	0.069
20 MHz+5 MHz	1720.0 - 1776.7	QPSK	22M8G7D	22.53	0.179
		16QAM	22M9W7D	22.00	0.158
		64QAM	22M9W7D	19.23	0.084
		256QAM	22M9W7D	17.93	0.062
5 MHz+20 MHz	1713.3 - 1770.0	QPSK	22M8G7D	22.95	0.197
		16QAM	22M9W7D	22.19	0.166
		64QAM	22M7W7D	19.48	0.089
		256QAM	22M7W7D	18.51	0.071
20 MHz+20 MHz	1720.0 - 1770.0	QPSK	37M5G7D	22.67	0.185
		16QAM	37M6W7D	22.13	0.163
		64QAM	37M5W7D	19.39	0.087
		256QAM	37M5W7D	18.12	0.065

REVIEWED BY

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.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2205-FC045	May 13, 2022	- First Approval Report

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

Table of Contents

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:	A3LSMG990U2
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-G990U2
Additional Model(s):	SM-G990U3/DS
Tx Frequency:	1715.3 - 1772.5: 10 MHz+15 MHz 1717.5 - 1774.7: 15 MHz+10 MHz 1715.5 - 1770.0: 10 MHz+20 MHz 1720.0 - 1774.5: 20 MHz+10 MHz 1717.5 - 1772.5: 15 MHz+15 MHz 1717.8 - 1770.0: 15 MHz+20 MHz 1720.0 - 1772.2: 20 MHz+15 MHz 1720.0 - 1776.7: 20 MHz+5 MHz 1713.3 - 1770.0: 5 MHz+20 MHz 1720.0 - 1770.0: 20 MHz+20 MHz
Date(s) of Tests:	April 05, 2022 ~ May 10, 2022
Serial number:	Radiated: R3CT30Q0QPV Conducted: R3CT30Q0SAV
LTE CA :	CA 66C (Uplink)

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS, CDMA(BC0, 1, 10) and LTE, Sub6.

It also supports IEEE 802.11 a/b/g/n/ac/ax (20/40/80), Bluetooth, BT LE, NFC, AIT, WPT, mmWave(n260/261).

2.2. MEASURING INSTRUMENT CALIBRATION

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

2.3. TEST FACILITY

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

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - ANSI C63.26-2015 – Section 5.2.6(only GSM)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - 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 ≥ 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;

$$P_{d\ (dBm)} = Pg_{\ (dBm)} - \text{cable loss}_{\ (dB)} + \text{antenna gain}_{\ (dB)}$$

   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 10^{th} harmonics from 9 kHz.

Test Note

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

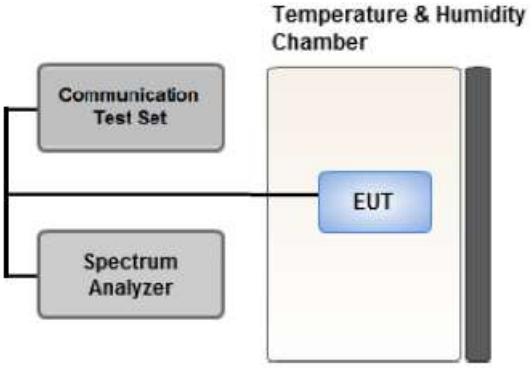
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

$$\text{EIRP}_{(dBm)} = \text{ERP}_{(dBm)} + 2.15$$

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
   .- for continuous transmissions, set to 1 ms,
   .- or burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1 %.

② **Alternate Procedure for PAPR**

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as as P_{Pk}. Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{Avg}. Determine the P.A.R. from:

$$P.A.R_{(dB)} = P_{Pk\,(dBm)} - P_{Avg\,(dBm)}\ (P_{Avg} = \text{Average Power} + \text{Duty cycle Factor})$$

Test Settings(Peak Power)

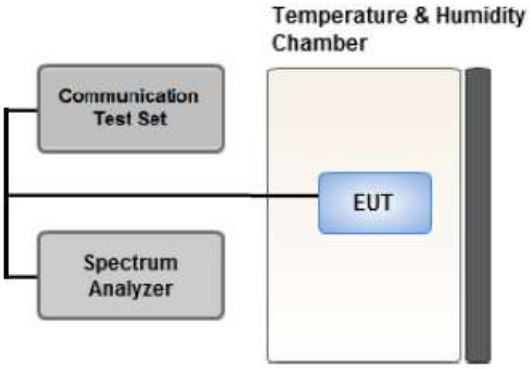
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period).
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

1. Set span to 2 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25 %.

3.5 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.

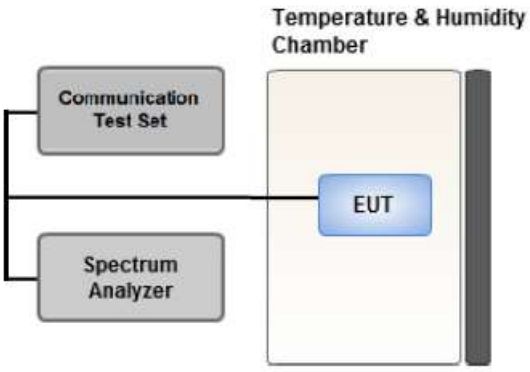
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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 ≥ 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

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

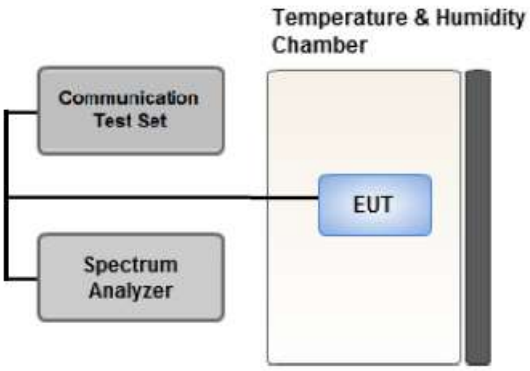
Test Overview

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

3.7 BAND EDGE



Test setup

Test Overview

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 ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

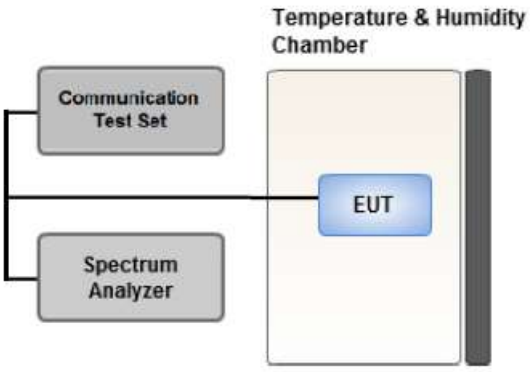
Test Notes

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.

3.8 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.

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	06/28/2022	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	08/30/2022	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/15/2023	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	10/13/2022	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	05/18/2022	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	06/01/2022	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	09/29/2022	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2022	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	07/12/2022	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6200863156	12/29/2022	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2022	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	06/02/2022	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. Especially, 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 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, k=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(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Peak- to- Average Ratio	27.50(d)(5)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§2.1055, § 27.54	Emission must remain in band	PASS

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	27.50(d)(4)	< 1 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(h)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
channel	Freq.(MHz)						W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	H	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 Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	H	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

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

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

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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 Note

1. All tests were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth.
2. Channel bandwidth is shown in the tables below based only on the channel bandwidths that were supported in this device.

Channel Bandwidth (PCC)	Channel Bandwidth (SCC)	Maximum aggregated bandwidth (MHz)
10	15	25
15	10	25
10	20	30
20	10	30
15	15	30
15	20	35
20	15	35
20	5	25
5	20	25
20	20	40

3. All modes of operation were investigated and the worst case configuration results are reported in this section.
Please refer to the table below.
- Worst case(Conducted Spurious Emissions, BandEdge)
: We have selected higher of the Conduction Output Power.
- Worst case(Radiated Spurious Emissions) : We have selected higher of the EIRP.
- Worst case(OBW, PAR, Frequency stability)
: All modes of operation were investigated and the worst case configuration results are reported.
4. All 3 channels(low/mid/high) of conducted power and radiated power were investigated
and the worst case channel results are reported.

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
Conducted Spurious Emissions/ Band Edge	QPSK	Low	20	1720.0	132072	1	99	10	1734.4	132216	1	0
		Mid	20	1752.5	132397	1	99	5	1764.2	132514	1	0
		High	10	1760.5	132477	1	49	15	1772.5	132597	1	0
		Low	20	1720.0	132072	1	0	10	1734.4	132216	1	49
		Mid	20	1752.5	132397	1	0	5	1764.2	132514	1	24
		High	10	1760.5	132477	1	0	15	1772.5	132597	1	74
		Low	20	1720.0	132072	100	0	15	1737.1	132243	75	0
		Mid	15	1750.1	132373	75	0	10	1762.1	132493	50	0
		High	10	1760.5	132477	50	0	15	1772.5	132597	75	0
		Low	20	1720.0	132072	100	0	20	1739.8	132270	100	0
		Mid	20	1745.1	132323	100	0	20	1764.9	132521	100	0
		High	20	1750.2	132374	100	0	20	1770.0	132572	100	0
Radiated Spurious Emissions	QPSK	Low	5	1713.3	132005	1	24	20	1725.0	132122	1	0
		Mid	10	1747.9	132351	1	49	15	1759.9	132471	1	0
		High	20	1750.2	132374	1	99	20	1770.0	132572	1	0

[Worst case]

Test Description	Mod	Operating frequency	PCC					SCC				
			BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset	BW (MHz)	Freq. (MHz)	Ch.	RB	RB Offset
OBW, PAR	QPSK, 16QAM, 64QAM 256QAM	Mid	10	1747.9	132351	50	0	15	1759.9	132471	75	0
			15	1750.1	132373	75	0	10	1762.1	132493	50	0
			10	1745.6	132328	50	0	20	1760.0	132472	100	0
			20	1750.1	132373	100	0	10	1764.5	132517	50	0
			15	1747.5	132347	75	0	15	1762.5	132497	75	0
			15	1745.3	132325	75	0	20	1762.4	132496	100	0
			20	1747.6	132348	100	0	15	1764.7	132519	75	0
			20	1752.5	132397	100	0	5	1764.2	132514	25	0
			5	1745.8	132330	25	0	20	1757.5	132447	100	0
			20	1745.1	132323	100	0	20	1764.9	132521	100	0
Frequency stability	QPSK	Low	5	1713.3	132005	25	0	20	1725.0	132122	100	0
			10	1715.3	132025	50	0	15	1727.3	132145	75	0
			15	1717.5	132047	75	0	10	1729.5	132167	50	0
			20	1720.0	132072	100	0	20	1739.8	132270	100	0
		High	5	1758.3	132455	25	0	20	1770.0	132572	100	0
			10	1772.5	132597	50	0	15	1784.5	132717	75	0
			15	1762.7	132499	75	0	10	1774.7	132619	50	0
			20	1750.2	132374	100	0	20	1770.0	132572	100	0

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8.1 Conducted Power

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	1	49	15	1727.3	132145	1	0	23.70
	15	1717.5	132047	1	74	10	1729.5	132167	1	0	23.68
	10	1715.5	132027	1	49	20	1729.9	132171	1	0	23.66
	20	***1720.0***	***132072***	***1***	***99***	***10***	***1734.4***	***132216***	***1***	***0***	***23.82***
	15	1717.5	132047	1	74	15	1732.5	132197	1	0	23.70
	15	1717.8	132050	1	74	20	1734.9	132221	1	0	23.67
	20	1720.0	132072	1	99	15	1737.1	132243	1	0	23.79
	20	1720.0	132072	1	99	5	1731.7	132189	1	0	23.68
	5	1713.3	132005	1	24	20	1725.0	132122	1	0	23.80
	20	1720.0	132072	1	99	20	1739.8	132270	1	0	23.75
Mid	10	1747.9	132351	1	49	15	1759.9	132471	1	0	23.92
	15	1750.1	132373	1	74	10	1762.1	132493	1	0	23.83
	10	1745.6	132328	1	49	20	1760.0	132472	1	0	23.80
	20	1750.1	132373	1	99	10	1764.5	132517	1	0	24.00
	15	1747.5	132347	1	74	15	1762.5	132497	1	0	23.99
	15	1745.3	132325	1	74	20	1762.4	132496	1	0	23.95
	20	1747.6	132348	1	99	15	1764.7	132519	1	0	23.96
	20	***1752.5***	***132397***	***1***	***99***	***5***	***1764.2***	***132514***	***1***	***0***	***24.10***
	5	1745.8	132330	1	24	20	1757.5	132447	1	0	23.87
	20	1745.1	132323	1	99	20	1764.9	132521	1	0	23.93
High	***10***	***1760.5***	***132477***	***1***	***49***	***15***	***1772.5***	***132597***	***1***	***0***	***24.01***
	15	1762.7	132499	1	74	10	1774.7	132619	1	0	23.81
	10	1755.6	132428	1	49	20	1770.0	132572	1	0	24.00
	20	1760.1	132473	1	99	10	1774.5	132617	1	0	23.95
	15	1757.5	132447	1	74	15	1772.5	132597	1	0	23.88
	15	1752.9	132401	1	74	20	1770.0	132572	1	0	23.96
	20	1755.1	132423	1	99	15	1772.2	132594	1	0	23.76
	20	1765.0	132522	1	99	5	1776.7	132639	1	0	23.71
	5	1758.3	132455	1	24	20	1770.0	132572	1	0	23.92
	20	1750.2	132374	1	99	20	1770.0	132572	1	0	23.93

Note:

Modulation : QPSK(1RB)

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	10	1715.3	132025	50	0	15	1727.3	132145	75	0	21.81
	15	1717.5	132047	75	0	10	1729.5	132167	50	0	21.84
	10	1715.5	132027	50	0	20	1729.9	132171	100	0	21.78
	20	1720.0	132072	100	0	10	1734.4	132216	50	0	21.81
	15	1717.5	132047	75	0	15	1732.5	132197	75	0	21.83
	15	1717.8	132050	75	0	20	1734.9	132221	100	0	21.82
	20	***1720.0***	***132072***	***100***	***0***	***15***	***1737.1***	***132243***	***75***	***0***	***22.46***
	20	1720.0	132072	100	0	5	1731.7	132189	25	0	21.85
	5	1713.3	132005	25	0	20	1725.0	132122	100	0	21.82
	20	1720.0	132072	100	0	20	1739.8	132270	100	0	21.77
Mid	10	1747.9	132351	50	0	15	1759.9	132471	75	0	22.34
	15	***1750.1***	***132373***	***75***	***0***	***10***	***1762.1***	***132493***	***50***	***0***	***22.38***
	10	1745.6	132328	50	0	20	1760.0	132472	100	0	22.26
	20	1750.1	132373	100	0	10	1764.5	132517	50	0	22.27
	15	1747.5	132347	75	0	15	1762.5	132497	75	0	22.34
	15	1745.3	132325	75	0	20	1762.4	132496	100	0	22.12
	20	1747.6	132348	100	0	15	1764.7	132519	75	0	22.23
	20	1752.5	132397	100	0	5	1764.2	132514	25	0	22.36
	5	1745.8	132330	25	0	20	1757.5	132447	100	0	22.30
	20	1745.1	132323	100	0	20	1764.9	132521	100	0	22.22
High	***10***	***1760.5***	***132477***	***50***	***0***	***15***	***1772.5***	***132597***	***75***	***0***	***22.46***
	15	1762.7	132499	75	0	10	1774.7	132619	50	0	22.36
	10	1755.6	132428	50	0	20	1770.0	132572	100	0	22.38
	20	1760.1	132473	100	0	10	1774.5	132617	50	0	22.32
	15	1757.5	132447	75	0	15	1772.5	132597	75	0	22.35
	15	1752.9	132401	75	0	20	1770.0	132572	100	0	22.39
	20	1755.1	132423	100	0	15	1772.2	132594	75	0	22.33
	20	1765.0	132522	100	0	5	1776.7	132639	25	0	22.34
	5	1758.3	132455	25	0	20	1770.0	132572	100	0	22.40
	20	1750.2	132374	100	0	20	1770.0	132572	100	0	22.10

Note:

Modulation : QPSK(Full RB)

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	20	1720.0	132072	1	99	10	1734.4	132216	1	0	23.19
Mid	20	1752.5	132397	1	99	5	1764.2	132514	1	0	23.28
High	10	1760.5	132477	1	49	15	1772.5	132597	1	0	23.26
Low	20	1720.0	132072	100	0	15	1737.1	132243	75	0	21.56
Mid	15	1750.1	132373	75	0	10	1762.1	132493	50	0	21.28
High	10	1760.5	132477	50	0	15	1772.5	132597	75	0	21.47

Note:

Modulation : 16QAM

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	20	1720.0	132072	1	99	10	1734.4	132216	1	0	20.53
Mid	20	1752.5	132397	1	99	5	1764.2	132514	1	0	20.61
High	10	1760.5	132477	1	49	15	1772.5	132597	1	0	20.65
Low	20	1720.0	132072	100	0	15	1737.1	132243	75	0	20.65
Mid	15	1750.1	132373	75	0	10	1762.1	132493	50	0	20.44
High	10	1760.5	132477	50	0	15	1772.5	132597	75	0	20.58

Note:

Modulation : 64QAM

Operating frequency	PCC					SCC					Conducted. Power [dBm]
	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	Bandwidth [MHz]	Freq. (MHz)	Channel	RB	RB Offset	
Low	20	1720.0	132072	1	99	10	1734.4	132216	1	0	19.09
Mid	20	1752.5	132397	1	99	5	1764.2	132514	1	0	19.44
High	10	1760.5	132477	1	49	15	1772.5	132597	1	0	19.49
Low	20	1720.0	132072	100	0	15	1737.1	132243	75	0	19.44
Mid	15	1750.1	132373	75	0	10	1762.1	132493	50	0	19.48
High	10	1760.5	132477	50	0	15	1772.5	132597	75	0	19.46

Note:

Modulation : 256QAM

8.2 Equivalent Isotropic Radiated Power

	PCC			SCC			Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol.	E.I.R.P	
	BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset						W	dBm
Low	10	132025	1/49	15	132145	1/0	-19.09	14.62	10.08	2.05	H	0.184	22.65
	15	132047	1/74	10	132167	1/0	-19.23	14.48	10.08	2.05	H	0.178	22.51
	10	132027	1/49	20	132171	1/0	-18.90	14.81	10.08	2.05	H	0.192	22.84
	20	132072	1/99	10	132216	1/0	-19.15	14.55	10.12	2.05	H	0.183	22.62
	15	132047	1/74	15	132197	1/0	-19.09	14.62	10.10	2.05	H	0.185	22.67
	15	132050	1/74	20	132221	1/0	-19.11	14.60	10.10	2.05	H	0.184	22.65
	20	132072	1/99	15	132243	1/0	-19.18	14.52	10.12	2.05	H	0.182	22.59
	20	132072	1/99	5	132189	1/0	-19.23	14.48	10.10	2.05	H	0.179	22.53
	5	***132005***	***1/24***	***20***	***132122***	***1/0***	***-18.79***	***14.92***	***10.08***	***2.05***	***H***	***0.197***	***22.95***
	20	132072	1/99	20	132270	1/0	-19.10	14.60	10.12	2.05	H	0.185	22.67
Mid	***10***	***132025***	***1/49***	***15***	***132471***	***1/0***	***-19.00***	***14.71***	***10.20***	***2.06***	***H***	***0.193***	***22.85***
	15	132047	1/74	10	132493	1/0	-19.38	14.29	10.21	2.06	H	0.175	22.44
	10	132027	1/49	20	132472	1/0	-19.64	14.07	10.20	2.06	H	0.166	22.21
	20	132072	1/99	10	132517	1/0	-19.48	14.14	10.22	2.06	H	0.170	22.30
	15	132047	1/74	15	132497	1/0	-19.28	14.39	10.21	2.06	H	0.179	22.54
	15	132050	1/74	20	132496	1/0	-19.02	14.69	10.20	2.06	H	0.192	22.83
	20	132072	1/99	15	132519	1/0	-19.22	14.45	10.21	2.06	H	0.182	22.60
	20	132072	1/99	5	132514	1/0	-19.56	14.06	10.22	2.06	H	0.167	22.22
	5	132005	1/24	20	132447	1/0	-19.51	14.20	10.20	2.06	H	0.172	22.34
	20	132072	1/99	20	132521	1/0	-19.33	14.34	10.21	2.06	H	0.177	22.49
High	10	132025	1/49	15	132597	1/0	-19.72	13.94	10.23	2.07	H	0.162	22.10
	15	132047	1/74	10	132619	1/0	-19.68	14.01	10.24	2.07	H	0.165	22.18
	10	132027	1/49	20	132572	1/0	-19.65	13.97	10.22	2.06	H	0.163	22.13
	20	132072	1/99	10	132617	1/0	-19.44	14.25	10.24	2.07	H	0.175	22.42
	15	132047	1/74	15	132597	1/0	-19.61	14.05	10.23	2.07	H	0.166	22.21
	15	132050	1/74	20	132572	1/0	-19.61	14.01	10.22	2.06	H	0.165	22.17
	20	132072	1/99	15	132594	1/0	-19.58	14.04	10.22	2.06	H	0.166	22.20
	20	132072	1/99	5	132639	1/0	-19.58	14.11	10.24	2.07	H	0.169	22.28
	5	132005	1/24	20	132572	1/0	-20.46	13.20	10.23	2.07	H	0.137	21.36
	20	***132072***	***1/99***	***20***	***132572***	***1/0***	***-19.35***	***14.27***	***10.22***	***2.06***	***H***	***0.175***	***22.43***

Note:

1. Modulation : QPSK
2. Limit : < 1 Watts

PCC			SCC			Measured	Substitute	Ant.	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset	Level (dBm)	Level (dBm)	Gain (dBi)			W	dBm
10	132025	1/49	15	132145	1/0	-19.62	14.09	10.08	2.05	H	0.163	22.12
15	132047	1/74	10	132167	1/0	-19.69	14.02	10.08	2.05	H	0.160	22.05
10	132027	1/49	20	132171	1/0	-19.62	14.09	10.08	2.05	H	0.163	22.12
20	132072	1/99	10	132216	1/0	-19.64	14.06	10.12	2.05	H	0.163	22.13
15	132047	1/74	15	132197	1/0	-19.75	13.96	10.10	2.05	H	0.159	22.01
15	132050	1/74	20	132221	1/0	-19.56	14.15	10.10	2.05	H	0.166	22.20
20	132072	1/99	15	132243	1/0	-19.62	14.08	10.12	2.05	H	0.164	22.15
20	132072	1/99	5	132189	1/0	-19.76	13.95	10.10	2.05	H	0.158	22.00
5	132005	1/24	20	132122	1/0	-19.55	14.16	10.08	2.05	H	0.166	22.19
20	132072	1/99	20	132270	1/0	-19.64	14.06	10.12	2.05	H	0.163	22.13
10	132025	1/49	15	132471	1/0	-19.64	14.07	10.20	2.06	H	0.166	22.21
20	132072	1/99	20	132572	1/0	-20.03	13.59	10.22	2.06	H	0.150	21.75

Note:

1. Modulation : 16QAM

2. Limit : < 1 Watts

PCC			SCC			Measured	Substitute	Ant.	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset	Level (dBm)	Level (dBm)	Gain (dBi)			W	dBm
10	132025	1/49	15	132145	1/0	-22.31	11.40	10.08	2.05	H	0.088	19.43
15	132047	1/74	10	132167	1/0	-22.51	11.20	10.08	2.05	H	0.084	19.23
10	132027	1/49	20	132171	1/0	-22.23	11.48	10.08	2.05	H	0.089	19.51
20	132072	1/99	10	132216	1/0	-22.31	11.39	10.12	2.05	H	0.088	19.46
15	132047	1/74	15	132197	1/0	-22.38	11.33	10.10	2.05	H	0.087	19.38
15	132050	1/74	20	132221	1/0	-22.28	11.43	10.10	2.05	H	0.089	19.48
20	132072	1/99	15	132243	1/0	-22.33	11.37	10.12	2.05	H	0.088	19.44
20	132072	1/99	5	132189	1/0	-22.53	11.18	10.10	2.05	H	0.084	19.23
5	132005	1/24	20	132122	1/0	-22.26	11.45	10.08	2.05	H	0.089	19.48
20	132072	1/99	20	132270	1/0	-22.38	11.32	10.12	2.05	H	0.087	19.39
10	132025	1/49	15	132471	1/0	-22.44	11.27	10.20	2.06	H	0.087	19.41
20	132072	1/99	20	132572	1/0	-22.75	10.87	10.22	2.06	H	0.080	19.03

Note:

1. Modulation : 64QAM

2. Limit : < 1 Watts

PCC			SCC			Measured	Substitute	Ant.	C.L	Pol.	E.I.R.P	
BW [MHz]	Channel	RB/ Offset	BW [MHz]	Channel	RB/ Offset	Level (dBm)	Level (dBm)	Gain (dBi)			W	dBm
10	132025	1/49	15	132145	1/0	-23.33	10.38	10.08	2.05	H	0.069	18.41
15	132047	1/74	10	132167	1/0	-23.57	10.14	10.08	2.05	H	0.066	18.17
10	132027	1/49	20	132171	1/0	-23.39	10.32	10.08	2.05	H	0.068	18.35
20	132072	1/99	10	132216	1/0	-23.75	9.95	10.12	2.05	H	0.063	18.02
15	132047	1/74	15	132197	1/0	-23.58	10.13	10.10	2.05	H	0.066	18.18
15	132050	1/74	20	132221	1/0	-23.65	10.06	10.10	2.05	H	0.065	18.11
20	132072	1/99	15	132243	1/0	-23.36	10.34	10.12	2.05	H	0.069	18.41
20	132072	1/99	5	132189	1/0	-23.83	9.88	10.10	2.05	H	0.062	17.93
5	132005	1/24	20	132122	1/0	-23.23	10.48	10.08	2.05	H	0.071	18.51
20	132072	1/99	20	132270	1/0	-23.65	10.05	10.12	2.05	H	0.065	18.12
10	132025	1/49	15	132471	1/0	-23.37	10.34	10.20	2.06	H	0.071	18.48
20	132072	1/99	20	132572	1/0	-23.81	9.81	10.22	2.06	H	0.063	17.97

Note:

1. Modulation : 256QAM

2. Limit : < 1 Watts

8.3 Conducted Spurious Emissions

Operating frequency	PCC				SCC				Measurement Maximum Frequency (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)
	BW [MHz]	Ch.	Freq. (MHz)	RB/ Offset	BW [MHz]	Ch.	Freq. (MHz)	RB/ Offset				
Low	20	132072	1720.0	1/99	10	132216	1734.4	1/0	8.2872	28.591	-75.52	-46.93
Mid	20	132397	1752.5	1/99	5	132514	1764.2	1/0	8.0339	28.591	-75.36	-46.77
High	10	132477	1760.5	1/49	15	132597	1772.5	1/0	8.8799	28.591	-75.40	-46.81
Low	20	132072	1720.0	1/0	10	132216	1734.4	1/49	8.8878	28.591	-75.46	-46.87
Mid	20	132397	1752.5	1/0	5	132514	1764.2	1/24	9.1072	28.591	-75.81	-47.21
High	10	132477	1760.5	1/0	15	132597	1772.5	1/74	8.2971	28.591	-74.43	-45.84
Low	20	132072	1720.0	100/0	15	132243	1737.1	75/0	4.0190	27.976	-75.74	-47.76
Mid	15	132373	1750.1	75/0	10	132493	1762.1	50/0	9.1057	28.591	-75.35	-46.75
High	10	132477	1760.5	50/0	15	132597	1772.5	75/0	8.2991	28.591	-74.65	-46.05
Low	20	132072	1720.0	100/0	20	132270	1739.8	100/0	8.2981	28.591	-75.07	-46.48
Mid	20	132323	1745.1	100/0	20	132521	1764.9	100/0	5.5115	28.591	-74.90	-46.30
High	20	132374	1750.2	100/0	20	132572	1770.0	100/0	9.1162	28.591	-75.50	-46.91

Note:

1. Modulation : QPSK

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

3. Factors for frequency :

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

4. Limit : -13.0 dBm

Frequency Range : 30 MHz ~ 10 GHz

PCC 10MHz Ch132477 RB1 Offset0 SCC 15MHz Ch132597 RB1 Offset74

PCC 10MHz Ch132477 RB1 Offset49 SCC 15MHz Ch132597 RB1 Offset0

PCC 10MHz Ch132477 RB50 Offset0 SCC 15MHz Ch132597 RB75 Offset0

PCC 15MHz Ch132373 RB75 Offset0 SCC 10MHz Ch132493 RB50 Offset0

PCC 20MHz Ch132072 RB1 Offset0 SCC 10MHz Ch132216 RB1 Offset49

PCC 20MHz Ch132072 RB1 Offset99 SCC 10MHz Ch132216 RB1 Offset0

PCC 20MHz Ch132072 RB100 Offset0 SCC 15MHz Ch132243 RB75 Offset0

PCC 20MHz Ch132072 RB100 Offset0 SCC 20MHz Ch132270 RB100 Offset0

PCC 20MHz Ch132323 RB100 Offset0 SCC 20MHz Ch132521 RB100 Offset0

PCC 20MHz Ch132374 RB100 Offset0 SCC 20MHz Ch132572 RB100 Offset0

PCC 20MHz Ch132397 RB1 Offset0 SCC 5MHz Ch132514 RB1 Offset24

PCC 20MHz Ch132397 RB1 Offset99 SCC 5MHz Ch132514 RB1 Offset0

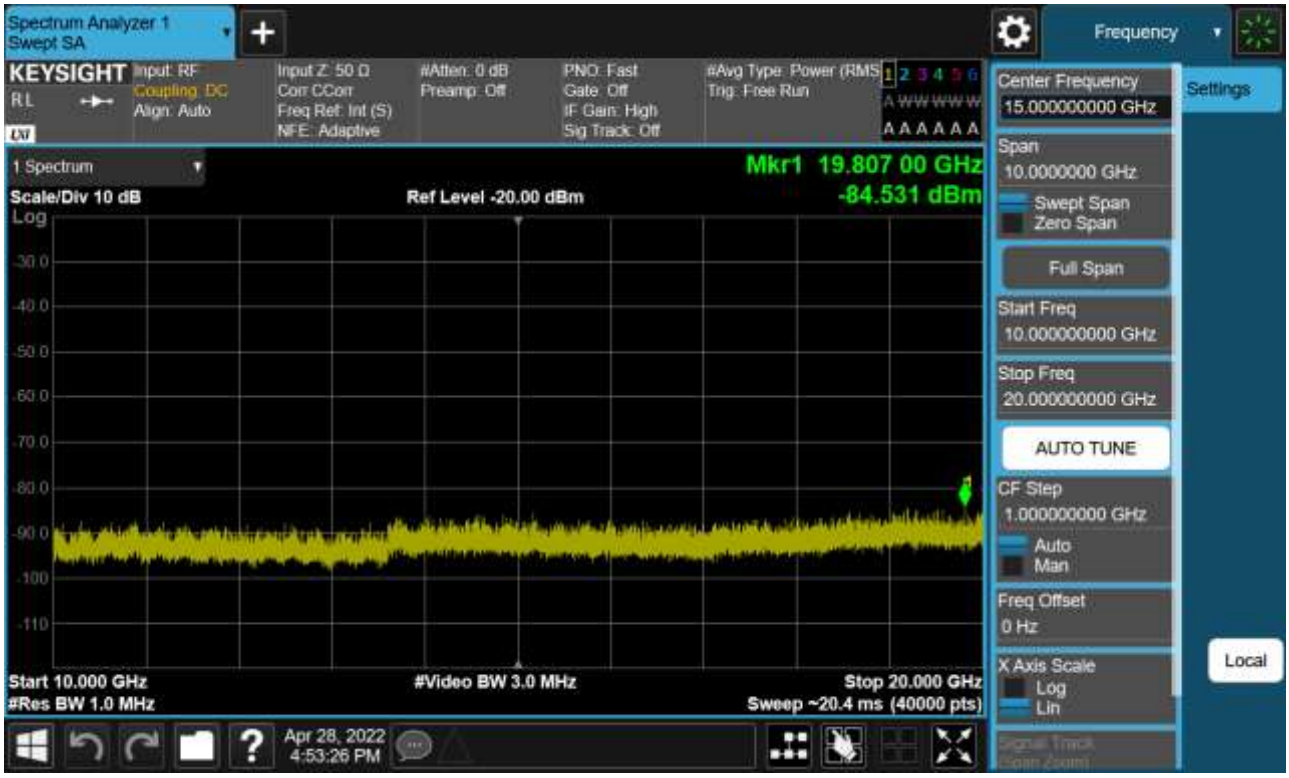
Frequency Range : 10 GHz ~ 26.5 GHz

PCC 10MHz Ch132477 RB1 Offset0, SCC 15MHz Ch132597 RB1 Offset74

PCC 10MHz Ch132477 RB1 Offset49, SCC 15MHz Ch132597 RB1 Offset0

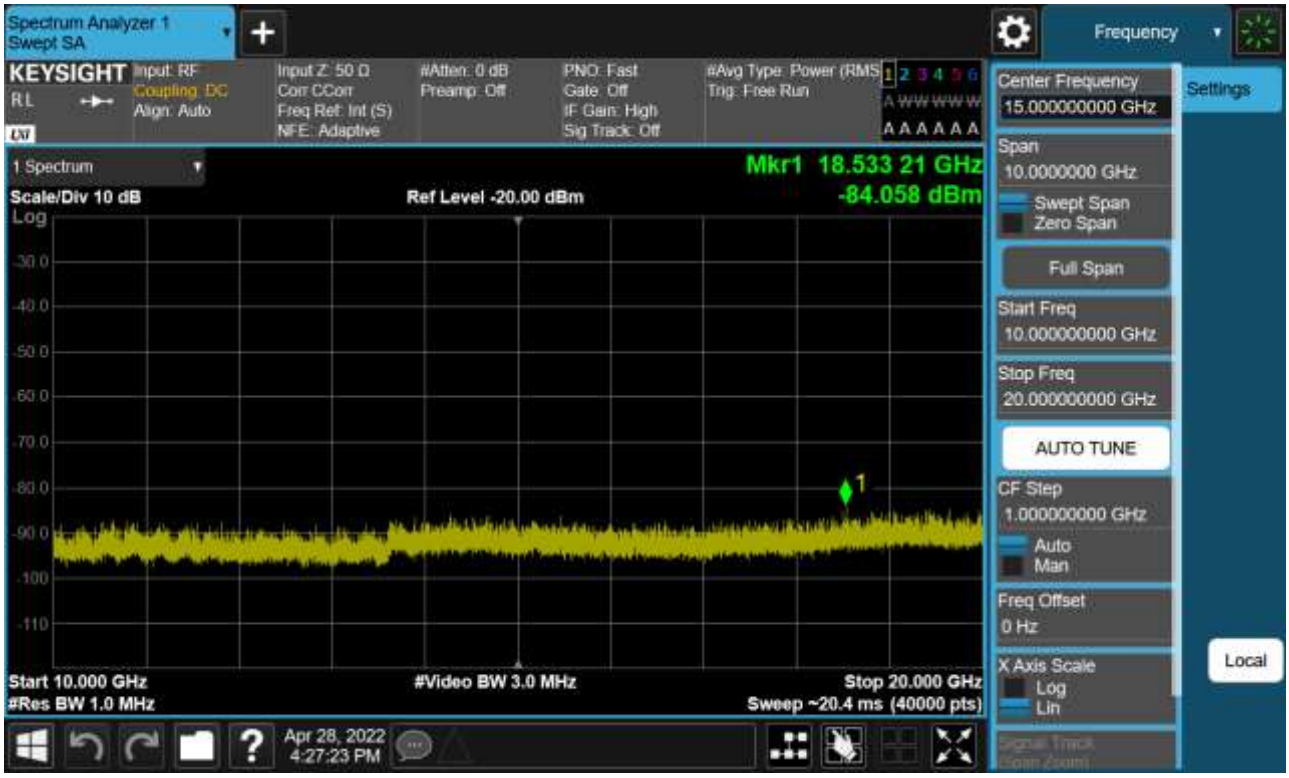
PCC 10MHz Ch132477 RB50 Offset0, SCC 15MHz Ch132597 RB75 Offset0

PCC 15MHz Ch132373 RB75 Offset0, SCC 10MHz Ch132493 RB50 Offset0



PCC 20MHz Ch132072 RB1 Offset0, SCC 10MHz Ch132216 RB1 Offset49

PCC 20MHz Ch132072 RB1 Offset99, SCC 10MHz Ch132216 RB1 Offset0



PCC 20MHz Ch132072 RB100 Offset0, SCC 15MHz Ch132243 RB75 Offset0

PCC 20MHz Ch132072 RB100 Offset0, SCC 20MHz Ch132270 RB100 Offset0

PCC 20MHz Ch132323 RB100 Offset0, SCC 20MHz Ch132521 RB100 Offset0

PCC 20MHz Ch132374 RB100 Offset0, SCC 20MHz Ch132572 RB100 Offset0

PCC 20MHz Ch132397 RB1 Offset0, SCC 5MHz Ch132514 RB1 Offset24

PCC 20MHz Ch132397 RB1 Offset99, SCC 5MHz Ch132514 RB1 Offset0

8.4 Channel Edge

Lowest Channel_PCC 20MHz Ch132072 RB1 Offset0 SCC 10MHz Ch132216 RB1 Offset49(1)

Lowest Channel_PCC 20MHz Ch132072 RB1 Offset0 SCC 10MHz Ch132216 RB1 Offset49(2)

Lowest Channel_PCC 20MHz Ch132072 RB1 Offset99 SCC 10MHz Ch132216 RB1 Offset0(1)

Lowest Channel_PCC 20MHz Ch132072 RB1 Offset99 SCC 10MHz Ch132216 RB1 Offset0(2)

Lowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 15MHz Ch132243 RB75 Offset0(1)

Lowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 15MHz Ch132243 RB75 Offset0(2)

LLowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 20MHz Ch132270 RB100 Offset0(1)

Lowest Channel_PCC 20MHz Ch132072 RB100 Offset0 SCC 20MHz Ch132270 RB100 Offset0(2)

Highest Channel_PCC 10MHz Ch132477 RB1 Offset0 SCC 15MHz Ch132597 RB1 Offset74(1)

Highest Channel_PCC 10MHz Ch132477 RB1 Offset0 SCC 15MHz Ch132597 RB1 Offset74(2)

Highest Channel_PCC 10MHz Ch132477 RB1 Offset49 SCC 15MHz Ch132597 RB1 Offset0(1)

Highest Channel_PCC 10MHz Ch132477 RB1 Offset49 SCC 15MHz Ch132597 RB1 Offset0(2)

Highest Channel_PCC 10MHz Ch132477 RB50 Offset0 SCC 15MHz Ch132597 RB75 Offset0(1)

Highest Channel_PCC 10MHz Ch132477 RB50 Offset0 SCC 15MHz Ch132597 RB75 Offset0(2)

Highest Channel_PCC 20MHz Ch132374 RB100 Offset0 SCC 20MHz Ch132572 RB100 Offset0(1)

Highest Channel_PCC 20MHz Ch132374 RB100 Offset0 SCC 20MHz Ch132572 RB100 Offset0(2)

8.5 Frequency Stability / Variation Of Ambient Temperature

▣ PCC Channel: 132005
▣ PCC Frequency: 1713.3 MHz
▣ PCC BandWidth: 5 MHz
▣ SCC Channel: 132122
▣ SCC Frequency: 1725.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	-0.041	0.031	1713.29985	1725.00000
100 %		-30	0.038	-0.051	1713.30007	1724.99986
100 %		-20	0.020	-0.035	1713.29997	1724.99994
100 %		-10	-0.026	0.039	1713.29991	1725.00003
100 %		0	0.026	0.018	1713.29999	1724.99995
100 %		10	0.020	0.038	1713.30004	1725.00000
100 %		30	0.018	0.026	1713.30002	1725.00002
100 %		40	0.031	-0.038	1713.30000	1724.99986
100 %		50	-0.032	-0.049	1713.29989	1724.99991
Batt. Endpoint	3.650	20	0.031	0.021	1713.30003	1724.99999

▣ PCC Channel: 132025
▣ PCC Frequency: 1715.3 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 132145
▣ SCC Frequency: 1727.3 MHz
▣ SCC BandWidth: 15 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	0.019	0.038	1715.30002	1727.30003
100 %		-30	0.026	0.025	1715.30004	1727.30002
100 %		-20	0.021	-0.031	1715.30002	1727.29995
100 %		-10	0.026	-0.033	1715.30000	1727.29992
100 %		0	0.026	0.030	1715.29995	1727.30000
100 %		10	0.041	0.030	1715.30005	1727.30002
100 %		30	-0.035	-0.037	1715.29989	1727.29994
100 %		40	-0.031	0.027	1715.29988	1727.29997
100 %		50	0.030	0.023	1715.29999	1727.29999
Batt. Endpoint	3.650	20	0.025	0.026	1715.29999	1727.29995

▣ PCC Channel: 132047
▣ PCC Frequency: 1717.5 MHz
▣ PCC BandWidth: 15 MHz
▣ SCC Channel: 132167
▣ SCC Frequency: 1729.5 MHz
▣ SCC BandWidth: 10 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	0.035	-0.041	1717.50005	1729.49989
100 %		-30	0.017	0.033	1717.50000	1729.50004
100 %		-20	-0.043	-0.043	1717.49990	1729.49992
100 %		-10	-0.024	0.028	1717.49988	1729.50001
100 %		0	0.022	-0.031	1717.50000	1729.49992
100 %		10	-0.026	-0.034	1717.49994	1729.49985
100 %		30	0.024	0.026	1717.50004	1729.50003
100 %		40	-0.035	0.033	1717.49988	1729.50003
100 %		50	-0.046	0.026	1717.49988	1729.50000
Batt. Endpoint	3.650	20	0.034	0.031	1717.50006	1729.50001

▣ PCC Channel: 132072
▣ PCC Frequency: 1720.0 MHz
▣ PCC BandWidth: 20 MHz
▣ SCC Channel: 132270
▣ SCC Frequency: 1739.8 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	0.034	-0.040	1720.00004	1739.79986
100 %		-30	0.019	-0.044	1719.99995	1739.79990
100 %		-20	0.021	-0.031	1720.00003	1739.79995
100 %		-10	0.032	0.019	1719.99998	1739.79998
100 %		0	0.027	0.023	1720.00001	1739.80003
100 %		10	0.037	0.025	1719.99997	1739.80001
100 %		30	0.029	0.029	1720.00000	1739.80005
100 %		40	0.023	-0.034	1719.99998	1739.79988
100 %		50	0.037	0.031	1720.00007	1739.80006
Batt. Endpoint	3.650	20	-0.048	0.020	1719.99986	1739.80003

▣ PCC Channel: 132455
▣ PCC Frequency: 1758.3 MHz
▣ PCC BandWidth: 5 MHz
▣ SCC Channel: 132572
▣ SCC Frequency: 1770.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	0.021	0.035	1758.30001	1770.00002
100 %		-30	0.027	0.036	1758.29998	1770.00006
100 %		-20	0.029	0.024	1758.29999	1769.99997
100 %		-10	0.026	0.026	1758.30004	1769.99996
100 %		0	0.031	-0.043	1758.30000	1769.99989
100 %		10	0.036	-0.032	1758.29998	1769.99990
100 %		30	0.032	0.028	1758.30005	1770.00002
100 %		40	0.036	-0.036	1758.30003	1769.99986
100 %		50	0.023	0.037	1758.30001	1770.00002
Batt. Endpoint	3.650	20	0.021	-0.034	1758.30002	1769.99988

▣ PCC Channel: 132597
▣ PCC Frequency: 1772.5 MHz
▣ PCC BandWidth: 10 MHz
▣ SCC Channel: 132717
▣ SCC Frequency: 1784.5 MHz
▣ SCC BandWidth: 15 MHz
▣ Voltage : 3.880 VDC
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	-0.045	0.023	1772.49990	1784.50004
100 %		-30	0.032	0.030	1772.49998	1784.50005
100 %		-20	0.033	-0.040	1772.49999	1784.49986
100 %		-10	0.034	0.026	1772.50001	1784.50002
100 %		0	0.029	0.027	1772.50000	1784.50000
100 %		10	0.026	0.035	1772.49999	1784.50000
100 %		30	0.020	0.021	1772.49996	1784.50001
100 %		40	0.027	0.033	1772.50000	1784.50003
100 %		50	0.027	0.041	1772.49999	1784.50001
Batt. Endpoint	3.650	20	0.028	-0.046	1772.49998	1784.49992

▣ PCC Channel: 132499

▣ PCC Frequency: 1762.7 MHz

▣ PCC BandWidth: 15 MHz

▣ SCC Channel: 132619

▣ SCC Frequency: 1774.7 MHz

▣ SCC BandWidth: 10 MHz

▣ Voltage : 3.880 VDC

▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	-0.049	0.021	1762.69991	1774.70005
100 %		-30	0.022	0.027	1762.69997	1774.70000
100 %		-20	0.037	0.021	1762.70001	1774.70001
100 %		-10	0.024	0.031	1762.69998	1774.70005
100 %		0	-0.037	0.033	1762.69986	1774.70000
100 %		10	0.017	0.033	1762.70000	1774.70002
100 %		30	0.034	0.031	1762.69997	1774.70006
100 %		40	-0.047	0.020	1762.69988	1774.70003
100 %		50	0.037	0.033	1762.69997	1774.70006
Batt. Endpoint	3.650	20	0.020	0.020	1762.69996	1774.70003

▣ PCC Channel: 132374
▣ PCC Frequency: 1750.2 MHz
▣ PCC BandWidth: 20 MHz
▣ SCC Channel: 132572
▣ SCC Frequency: 1770.0 MHz
▣ SCC BandWidth: 20 MHz
▣ Voltage : 3.880 MHz
▣ LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	PPM		Frequency Error (MHz)	
			PCC	SCC	PCC	SCC
100 %	3.880	+20(Ref)	0.025	0.030	1750.19999	1769.99999
100 %		-30	-0.029	0.035	1750.19992	1769.99997
100 %		-20	-0.048	0.029	1750.19985	1770.00000
100 %		-10	-0.025	0.034	1750.19986	1770.00006
100 %		0	0.032	0.015	1750.20004	1770.00004
100 %		10	0.034	0.028	1750.20003	1769.99999
100 %		30	0.027	0.026	1750.20000	1770.00001
100 %		40	-0.045	0.033	1750.19990	1769.99999
100 %		50	-0.046	-0.041	1750.19987	1769.99986
Batt. Endpoint	3.650	20	-0.028	0.023	1750.19995	1770.00001

8.6 Radiated Spurious Emissions

▣ PCC Channel : 132005 (1713.3 MHz)

▣ PCC BW(MHz) : 5

▣ PCC RB/ RB Offset : 1/ 24

▣ SCC Channel : 132122 (1725.0 MHz)

▣ SCC BW(MHz) : 20

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 3 meters

▣ LIMIT: -13.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
3 438.30	-55.30	12.52	-61.49	2.97	V	-51.94
5 157.45	-56.40	12.34	-54.21	3.65	H	-45.52
6 876.60	-55.57	11.95	-48.99	4.27	V	-41.31

▣ PCC Channel : 132328 (1745.6 MHz)

▣ PCC BW(MHz) : 10

▣ PCC RB/ RB Offset : 1/ 49

▣ SCC Channel : 132471 (1725.0 MHz)

▣ SCC BW(MHz) : 25

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 3 meters

▣ LIMIT: -13.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
3 507.80	-55.09	12.40	-61.04	2.98	H	-51.62
5 261.70	-56.63	12.84	-56.10	3.71	V	-46.97
7 015.60	-56.44	11.31	-48.05	4.32	H	-41.06

▣ PCC Channel : 132072 (1720.0 MHz)

▣ PCC BW(MHz) : 20

▣ PCC RB/ RB Offset : 1/ 99

▣ SCC Channel : 132572 (1770.0 MHz)

▣ SCC BW(MHz) : 20

▣ SCC RB/ RB Offset : 1/ 0

▣ DISTANCE: 1 meters

▣ LIMIT: -13.0 dBm

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)
3 520.20	-54.76	12.40	-60.56	2.99	V	-51.15
5 280.30	-56.73	12.92	-56.29	3.73	H	-47.10
7 040.40	-55.98	11.16	-47.60	4.31	H	-40.75

8.7 Occupied Bandwidth

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	QPSK	50/ 0	15	132471	1759.9	QPSK	75/ 0	23.163
15	132373	1750.1	QPSK	75/ 0	10	132493	1762.1	QPSK	50/ 0	23.043
10	132328	1745.6	QPSK	50/ 0	20	132472	1760.0	QPSK	100/ 0	27.726
20	132373	1750.1	QPSK	100/ 0	10	132517	1764.5	QPSK	50/ 0	27.858
15	132347	1747.5	QPSK	75/ 0	15	132497	1762.5	QPSK	75/ 0	28.326
15	132325	1745.3	QPSK	75/ 0	20	132496	1762.4	QPSK	100/ 0	32.510
20	132348	1747.6	QPSK	100/ 0	15	132519	1764.7	QPSK	75/ 0	32.698
20	132397	1752.5	QPSK	100/ 0	5	132514	1764.2	QPSK	25/ 0	22.841
5	132330	1745.8	QPSK	25/ 0	20	132447	1757.5	QPSK	100/ 0	22.797
20	132323	1745.1	QPSK	100/ 0	20	132521	1764.9	QPSK	100/ 0	37.521

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	16QAM	50/ 0	15	132471	1759.9	16QAM	75/ 0	23.108
15	132373	1750.1	16QAM	75/ 0	10	132493	1762.1	16QAM	50/ 0	23.121
10	132328	1745.6	16QAM	50/ 0	20	132472	1760.0	16QAM	100/ 0	27.684
20	132373	1750.1	16QAM	100/ 0	10	132517	1764.5	16QAM	50/ 0	27.795
15	132347	1747.5	16QAM	75/ 0	15	132497	1762.5	16QAM	75/ 0	28.337
15	132325	1745.3	16QAM	75/ 0	20	132496	1762.4	16QAM	100/ 0	32.553
20	132348	1747.6	16QAM	100/ 0	15	132519	1764.7	16QAM	75/ 0	32.637
20	132397	1752.5	16QAM	100/ 0	5	132514	1764.2	16QAM	25/ 0	22.938
5	132330	1745.8	16QAM	25/ 0	20	132447	1757.5	16QAM	100/ 0	22.847
20	132323	1745.1	16QAM	100/ 0	20	132521	1764.9	16QAM	100/ 0	37.605

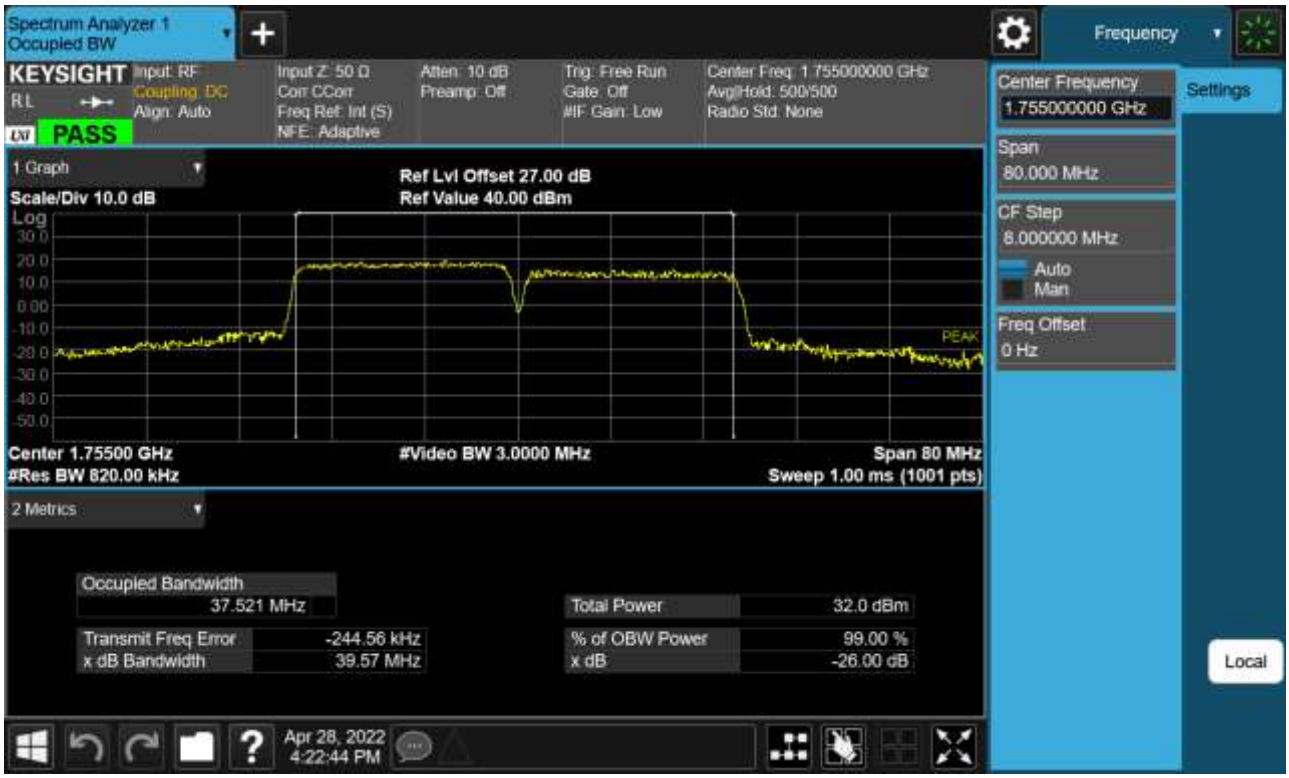
PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	64QAM	50/ 0	15	132471	1759.9	64QAM	75/ 0	23.026
15	132373	1750.1	64QAM	75/ 0	10	132493	1762.1	64QAM	50/ 0	23.064
10	132328	1745.6	64QAM	50/ 0	20	132472	1760.0	64QAM	100/ 0	27.569
20	132373	1750.1	64QAM	100/ 0	10	132517	1764.5	64QAM	50/ 0	27.728
15	132347	1747.5	64QAM	75/ 0	15	132497	1762.5	64QAM	75/ 0	28.251
15	132325	1745.3	64QAM	75/ 0	20	132496	1762.4	64QAM	100/ 0	32.459
20	132348	1747.6	64QAM	100/ 0	15	132519	1764.7	64QAM	75/ 0	32.512
20	132397	1752.5	64QAM	100/ 0	5	132514	1764.2	64QAM	25/ 0	22.901
5	132330	1745.8	64QAM	25/ 0	20	132447	1757.5	64QAM	100/ 0	22.741
20	132323	1745.1	64QAM	100/ 0	20	132521	1764.9	64QAM	100/ 0	37.465

PCC					SCC					Data (MHz)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	256QAM	50/ 0	15	132471	1759.9	256QAM	75/ 0	23.076
15	132373	1750.1	256QAM	75/ 0	10	132493	1762.1	256QAM	50/ 0	23.067
10	132328	1745.6	256QAM	50/ 0	20	132472	1760.0	256QAM	100/ 0	27.677
20	132373	1750.1	256QAM	100/ 0	10	132517	1764.5	256QAM	50/ 0	27.732
15	132347	1747.5	256QAM	75/ 0	15	132497	1762.5	256QAM	75/ 0	28.250
15	132325	1745.3	256QAM	75/ 0	20	132496	1762.4	256QAM	100/ 0	32.502
20	132348	1747.6	256QAM	100/ 0	15	132519	1764.7	256QAM	75/ 0	32.589
20	132397	1752.5	256QAM	100/ 0	5	132514	1764.2	256QAM	25/ 0	22.907
5	132330	1745.8	256QAM	25/ 0	20	132447	1757.5	256QAM	100/ 0	22.742
20	132323	1745.1	256QAM	100/ 0	20	132521	1764.9	256QAM	100/ 0	37.480

Note:

In order to simplify the report, attached plots were only Max.Bandwidth(20+20)

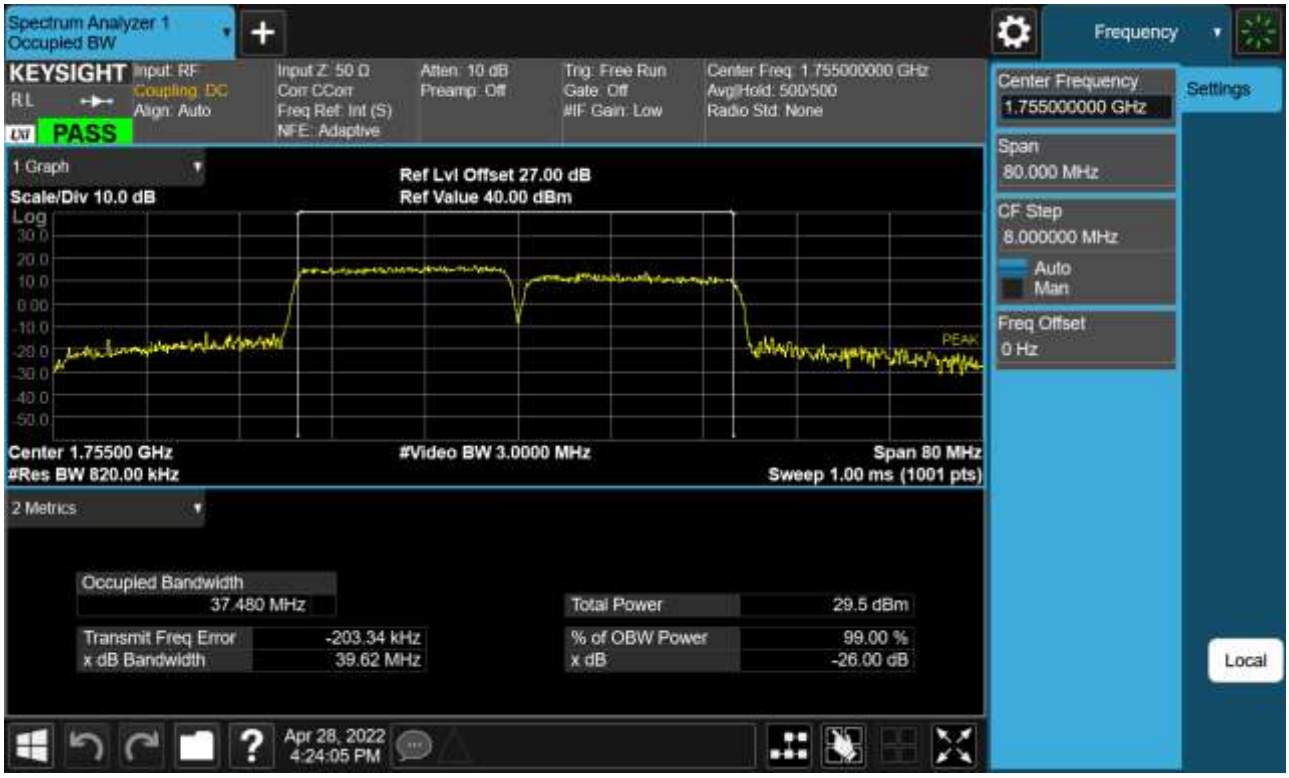
PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(QPSK)



PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(16QAM)

PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(64QAM)

PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(256QAM)



8.8 Peak- to- Average Ratio

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	QPSK	50/ 0	15	132471	1759.9	QPSK	75/ 0	5.25
15	132373	1750.1	QPSK	75/ 0	10	132493	1762.1	QPSK	50/ 0	5.29
10	132328	1745.6	QPSK	50/ 0	20	132472	1760.0	QPSK	100/ 0	5.22
20	132373	1750.1	QPSK	100/ 0	10	132517	1764.5	QPSK	50/ 0	5.26
15	132347	1747.5	QPSK	75/ 0	15	132497	1762.5	QPSK	75/ 0	5.25
15	132325	1745.3	QPSK	75/ 0	20	132496	1762.4	QPSK	100/ 0	5.34
20	132348	1747.6	QPSK	100/ 0	15	132519	1764.7	QPSK	75/ 0	5.26
20	132397	1752.5	QPSK	100/ 0	5	132514	1764.2	QPSK	25/ 0	5.31
5	132330	1745.8	QPSK	25/ 0	20	132447	1757.5	QPSK	100/ 0	5.17
20	132323	1745.1	QPSK	100/ 0	20	132521	1764.9	QPSK	100/ 0	5.23

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	16QAM	50/ 0	15	132471	1759.9	16QAM	75/ 0	6.01
15	132373	1750.1	16QAM	75/ 0	10	132493	1762.1	16QAM	50/ 0	6.01
10	132328	1745.6	16QAM	50/ 0	20	132472	1760.0	16QAM	100/ 0	5.93
20	132373	1750.1	16QAM	100/ 0	10	132517	1764.5	16QAM	50/ 0	5.94
15	132347	1747.5	16QAM	75/ 0	15	132497	1762.5	16QAM	75/ 0	6.28
15	132325	1745.3	16QAM	75/ 0	20	132496	1762.4	16QAM	100/ 0	6.04
20	132348	1747.6	16QAM	100/ 0	15	132519	1764.7	16QAM	75/ 0	6.00
20	132397	1752.5	16QAM	100/ 0	5	132514	1764.2	16QAM	25/ 0	6.02
5	132330	1745.8	16QAM	25/ 0	20	132447	1757.5	16QAM	100/ 0	5.94
20	132323	1745.1	16QAM	100/ 0	20	132521	1764.9	16QAM	100/ 0	6.39

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	64QAM	50/ 0	15	132471	1759.9	64QAM	75/ 0	6.39
15	132373	1750.1	64QAM	75/ 0	10	132493	1762.1	64QAM	50/ 0	6.42
10	132328	1745.6	64QAM	50/ 0	20	132472	1760.0	64QAM	100/ 0	6.41
20	132373	1750.1	64QAM	100/ 0	10	132517	1764.5	64QAM	50/ 0	6.38
15	132347	1747.5	64QAM	75/ 0	15	132497	1762.5	64QAM	75/ 0	7.01
15	132325	1745.3	64QAM	75/ 0	20	132496	1762.4	64QAM	100/ 0	6.39
20	132348	1747.6	64QAM	100/ 0	15	132519	1764.7	64QAM	75/ 0	6.43
20	132397	1752.5	64QAM	100/ 0	5	132514	1764.2	64QAM	25/ 0	6.38
5	132330	1745.8	64QAM	25/ 0	20	132447	1757.5	64QAM	100/ 0	6.38
20	132323	1745.1	64QAM	100/ 0	20	132521	1764.9	64QAM	100/ 0	7.03

PCC					SCC					Data (dBm)
BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	BW [MHz]	Ch	Freq [MHz]	Mod	RB/ Offset	
10	132351	1747.9	256QAM	50/ 0	15	132471	1759.9	256QAM	75/ 0	6.56
15	132373	1750.1	256QAM	75/ 0	10	132493	1762.1	256QAM	50/ 0	6.60
10	132328	1745.6	256QAM	50/ 0	20	132472	1760.0	256QAM	100/ 0	6.55
20	132373	1750.1	256QAM	100/ 0	10	132517	1764.5	256QAM	50/ 0	6.58
15	132347	1747.5	256QAM	75/ 0	15	132497	1762.5	256QAM	75/ 0	7.37
15	132325	1745.3	256QAM	75/ 0	20	132496	1762.4	256QAM	100/ 0	6.53
20	132348	1747.6	256QAM	100/ 0	15	132519	1764.7	256QAM	75/ 0	6.53
20	132397	1752.5	256QAM	100/ 0	5	132514	1764.2	256QAM	25/ 0	6.64
5	132330	1745.8	256QAM	25/ 0	20	132447	1757.5	256QAM	100/ 0	6.53
20	132323	1745.1	256QAM	100/ 0	20	132521	1764.9	256QAM	100/ 0	7.38

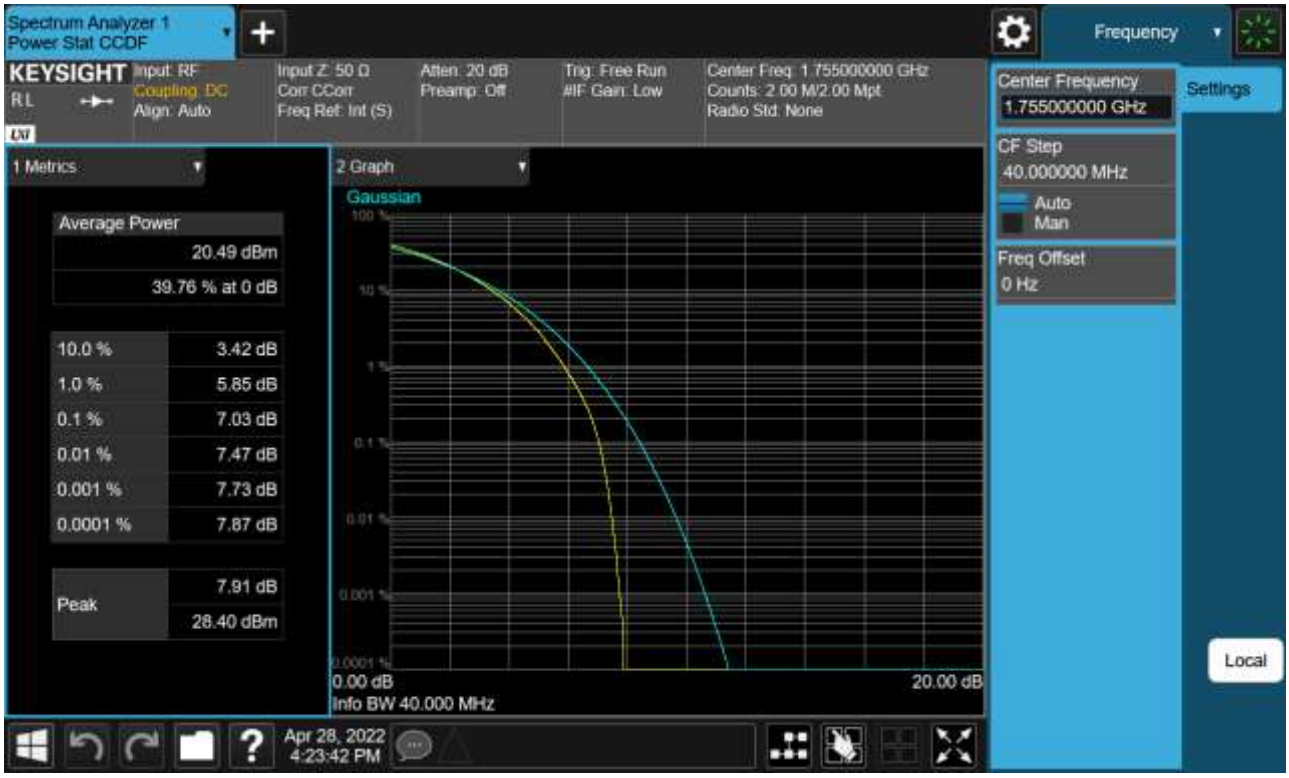
Note:

In order to simplify the report, attached plots were only Max.Bandwidth(20+20)

PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(QPSK)

PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(16QAM)

PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(64QAM)



PCC 20 MHz Ch132323 RB100 Offset0, SCC 20 MHz Ch132521 RB100 Offset0_(256QAM)

9. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2205-FC045-P