

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 96
47 CFR FCC Part 2

Report No.: RFCVSF-WTW-P25090814-9

FCC ID: PKRISGM4010

Product: Wireless Hotspot

Brand: Inseego

Model No.: M4010

Received Date: 2025/11/17

Test Date: 2025/12/1 ~ 2025/12/26

Issued Date: 2026/1/12

Applicant: Inseego Corp.

Address: 9710 Scranton Road, Suite 200, San Diego, CA 92121, USA

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan

FCC Registration /
Designation Number: 788550 / TW0003

Approved by: _____

Jeremy Lin

, Date: _____

2026/1/12

Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFCVSF-WTW-P25090814-9	Original release.	2026/1/12

1 Certificate

Product: Wireless Hotspot

Brand: Inseego

Test Model: M4010

Sample Status: Engineering sample

Applicant: Inseego Corp.

Test Date: 2025/12/1 ~ 2025/12/26

Standard: 47 CFR FCC Part 96
47 CFR FCC Part 2

Measurement procedure: ANSI/TIA/EIA-603-E 2016
ANSI C63.26-2015
KDB 971168 D01 Power Meas License Digital Systems v03r01
KDB 940660 D01 Part 96 CBRS Eqpt v03

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

Standard / Clause	Test Item	Result	Remark
Part 2.1046 Part 96.41(b)	Maximum EIRP	Pass	Meet the requirement of limit.
Part 2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
Part 2.1046 Part 96.41(b)	Maximum Power Spectral Density	N/A	Not Applicable. This device is End User Device.
Part 96.41(g)	Peak to Average Ratio	Pass	Meet the requirement of limit.
Part 2.1049	Bandwidth	Pass	Meet the requirement of limit.
Part 2.1051 Part 96.41(e)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
Part 2.1053 Part 96.41(e)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -3.16 dB at 624.61 MHz
Part 2.1053 Part 96.41(e)	Radiated Spurious Emissions above 1GHz	Pass	Minimum passing margin is -1.91 dB at 7230.20 MHz
Part 2.1055	Frequency Stability	Pass	Meet the requirement of limit.

Notes:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFCVSF-WTW-P25090814-6 for the modulation characteristics data of CA mode.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Parameter	Specification	Uncertainty (±)
Effective Radiated Power and Equivalent Isotropically Radiated Power	-	1.371 dB
Peak to Average Ratio	-	0.920 dB
Bandwidth	-	960 Hz
Conducted Spurious Emissions	-	2.12 dB
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	2.44 dB
	30 MHz ~ 1 GHz	2.95 dB
Radiated Spurious Emissions above 1GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB
Frequency Stability	-	0.176 ppm

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless Hotspot
Brand	Inseego
Test Model	M4010
Market Model Name	M4000, M4040
Model Difference	Marketing purpose
Status of EUT	Engineering sample
Power Supply Rating	5 Vdc or 9 Vdc or 12 Vdc from adapter 3.85 Vdc from battery
EUT Category	End User Device
Modulation Type	QPSK, 16QAM, 64QAM, 256QAM
LTE support SISO bands	B48
LTE bands support CA mode	48C
PC3 for Power Class	B48

Note:

1. The EUT uses following accessories.

Item	Brand	Model	Specification	P/N
AC Adapter	SUNUN	P181	AC Input: 100-240 Vac, 50/60 Hz, 0.5 A max DC Output: 5 Vdc, 3 A; 9 Vdc, 2 A; 12 Vdc, 1.5 A	-
USB Cable	inseego	-	Signal Line: 1.0 m, shielded	CAB-60723090
Battery	inseego	754685	3.85 Vdc, 5050 mAh, 19.44 Wh	-

2. EUT Overview

LTE Band 48C, Output Power: Full Power

Bandwidth	TX Frequency Range (MHz)	Modulation	Max. EIRP (W)	Max. EIRP (dBm)	Emission Designator
20 MHz + 20 MHz	3560 ~ 3690	QPSK	0.013	11.07	37M7G7D
		16QAM	0.010	10.01	37M7D7W
		64QAM	0.008	8.96	37M7D7W
		256QAM	0.006	7.89	37M7D7W

LTE Band 48C, Output Power: dBm/10 MHz

Bandwidth	TX Frequency Range (MHz)	Modulation	Max. EIRP (W)	Max. EIRP (dBm)	Emission Designator
20 MHz + 20 MHz	3560 ~ 3690	QPSK	0.013	10.99	37M7G7D
		16QAM	0.010	9.98	37M7D7W
		64QAM	0.008	8.93	37M7D7W
		256QAM	0.006	7.86	37M7D7W

3.2 Antenna Description of EUT

Type		PIFA		
Connector		Contact spring		
Band		Freq. Range (MHz)	Gain (dBi)	
			WWAN (A2-TX0)	WWAN (A3-TX1)
LTE B48C	1TX	3550 ~ 3700	0.31	0.97

* For 1TX (Diversity), the maximum antenna gain for each band were chosen for final test.

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case from all possible combinations of EUT configure mode (1TX or 2TX if available), channel, bandwidth, modulation and RB mode. See below table(s) for details.
Worst Case:	X-axis/ Y-axis/ Z-axis Worst Condition: Y-axis

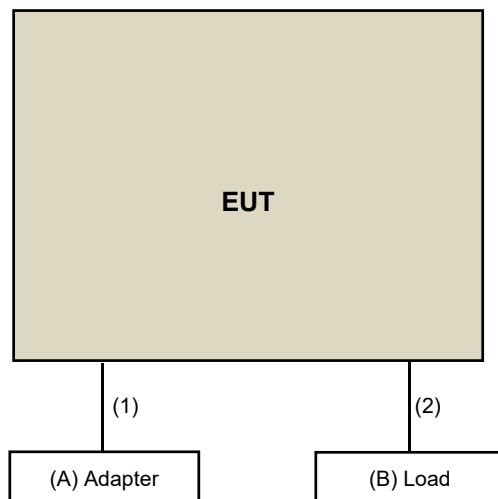
3.3.1 LTE Band 48C

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
Equivalent Isotropically Radiated Power	55340 (3560 MHz) + 55538 (3579.8 MHz) 55891 (3615.1 MHz) + 56089 (3634.9 MHz) 56442 (3670.2 MHz) + 56640 (3690 MHz)	20 MHz + 20 MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB Hall RB Full RB
Peak to Average Ratio	55340 (3560 MHz) + 55538 (3579.8 MHz) 55891 (3615.1 MHz) + 56089 (3634.9 MHz) 56442 (3670.2 MHz) + 56640 (3690 MHz)	20 MHz + 20 MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB
Bandwidth	55340 (3560 MHz) + 55538 (3579.8 MHz) 55891 (3615.1 MHz) + 56089 (3634.9 MHz) 56442 (3670.2 MHz) + 56640 (3690 MHz)	20 MHz + 20 MHz	QPSK / 16QAM / 64QAM / 256QAM	Full RB
Conducted Spurious Emissions	55340 (3560 MHz) + 55538 (3579.8 MHz) 55891 (3615.1 MHz) + 56089 (3634.9 MHz) 56442 (3670.2 MHz) + 56640 (3690 MHz)	20 MHz + 20 MHz	QPSK	1 RB Full RB
Radiated Spurious Emissions below 1GHz	55340 (3560 MHz) + 55538 (3579.8 MHz)	20 MHz + 20 MHz	QPSK	1 RB
Radiated Spurious Emissions above 1GHz	55340 (3560 MHz) + 55538 (3579.8 MHz) 55891 (3615.1 MHz) + 56089 (3634.9 MHz) 56442 (3670.2 MHz) + 56640 (3690 MHz)	20 MHz + 20 MHz	QPSK	1 RB
Frequency Stability	55340 (3560 MHz) + 56640 (3690 MHz)	20 MHz + 20 MHz	QPSK	Full RB

3.4 Test Program Used and Operation Descriptions

There is no need to controlling software during the test, and the EUT can be paired with the Radio Communication Analyzer to test the connection when it is powered on.

3.5 Connection Diagram of EUT and Peripheral Devices



Remote Site



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Adapter	SUNUN	P181	N/A	N/A	Accessory of EUT
B	Load	N/A	N/A	N/A	N/A	Provided by Lab
C	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	NA	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB Cable	1	1.0	Y	0	Accessory of EUT
2	RJ45 Cable	1	1.5	N	0	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Maximum EIRP

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Fixed Attenuator Woken	00800A1K01A-10	00800A1K01A-10-01	2025/5/23	2026/5/22
PXA Signal Analyzer Keysight	N9030B	MY57140938	2025/3/24	2026/3/23
Radio Communication Analyzer Anritsu	MT8821C	6201462755	2025/4/8	2026/4/7
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2025/12/1 ~ 2025/12/26

4.2 Peak to Average Ratio

Refer to section 4.1 to get the tested date and information of the instruments.

4.3 Bandwidth

Refer to section 4.1 to get the tested date and information of the instruments.

4.4 Conducted Spurious Emissions

Refer to section 4.1 to get the tested date and information of the instruments.

4.5 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Max-Full	MFA-440H	AT93021705	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-472	2025/9/16	2026/9/15
Loop Antenna TESEQ	HLA 6121	45745	2025/9/1	2026/8/31
MXE EMI Receiver Agilent	N9038A	MY51210203	2025/8/27	2026/8/26
Preamplifier EMCI	EMC 330H	980112	2025/9/21	2026/9/20
	EMC001340	980201	2025/9/21	2026/9/20
RF Coaxial Cable Woken	8D-FB	Cable-Ch10-01	2025/9/21	2026/9/20
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MG-7802	N/A	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 5.
2. Tested Date: 2025/12/3

4.6 Radiated Spurious Emissions above 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Max-Full	MFA-440H	AT93021705	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	7	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-969	2025/11/9	2026/11/8
	BBHA 9170	148	2025/11/9	2026/11/8
MXE EMI Receiver Agilent	N9038A	MY51210203	2025/8/27	2026/8/26
Preamplifier EMCI	EMC 184045	980116	2025/9/21	2026/9/20
	EMC118A45SE	980809	2025/4/24	2026/4/23
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2025/6/30	2026/6/29
	EMC102-KM-KM-3000	150929	2025/6/30	2026/6/29
	EMC104-SM-SM- 8000+3000	171005	2025/9/21	2026/9/20
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	2025/9/21	2026/9/20
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MG-7802	N/A	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 5.
2. Tested Date: 2025/12/3

4.7 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
3-channel DC power supply OWON	ODP3033	ODP30332128138	N/A	N/A
Digital Multimeter Fluke	8050A	4660081	2025/6/6	2026/6/5
Fixed Attenuator Woken	00800A1K01A-10	00800A1K01A-10-01	2025/5/23	2026/5/22
Signal & Spectrum Analyzer R&S	FSV3044	101504	2025/6/18	2026/6/17
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A
Temperature & Humidity Chamber Terchy	MHU-225AU	920842	2025/6/25	2026/6/24

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2025/12/24

5 Limits of Test Items

5.1 Maximum EIRP

For LTE Band 48C:

Device Category	Maximum EIRP (dBm/10 MHz)
End User Device	23
Category A CBSD	30
Category B CBSD	47

5.2 Peak to Average Ratio

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

5.3 Bandwidth

According to FCC 47 CFR part 2.1049, the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.

5.4 Conducted Spurious Emissions

For LTE Band 48C:

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B MHz (where B is the bandwidth in MHz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B MHz below the lower CBSD-assigned channel edge. At all frequencies greater than B MHz above the upper CBSD assigned channel edge and less than B MHz below the lower CBSD-assigned channel edge, the conducted power of any end user device emission shall not exceed -25 dBm/MHz.

Additional protection levels: The conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

5.5 Radiated Spurious Emissions below 1GHz

The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

5.6 Radiated Spurious Emissions above 1GHz

The power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/MHz.

5.7 Frequency Stability

For LTE Band 48C:

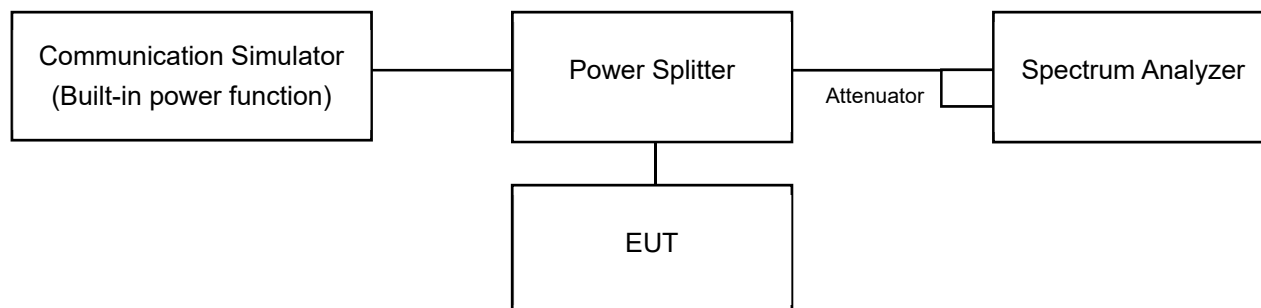
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation (authorized frequency block).

6 Test Arrangements

6.1 Maximum EIRP

6.1.1 Test Setup

Conducted Power Measurement:



6.1.2 Test Procedure

Conducted Power Measurement:

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology and link to spectrum analyzer measurements. Set the EUT to transmit under low, middle and high channel and record the power level shown on spectrum analyzer. Power measurements use detector average (rms).

Measurement method refers to ANSI C63.26 section 5.2.4.4.

- Set span to 2 × to 3 × the OBW.
- Set RBW = 1% to 5% of the OBW.
- Set VBW ≥ 3 × RBW.
- Set number of measurement points in sweep ≥ 2 × span / RBW.
- Set Sweep time = auto-couple.
- Detector = power averaging (rms).
- Set sweep trigger to “free run.”
- Trace average at least 100 traces in power averaging (rms) mode.
- Use the Band/Channel Power function to determine the integrated power per 10 MHz bandwidth and full bandwidth, according to the 47 CFR FCC Part 96 standard.
- If Duty cycle < 98%, Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.

Maximum EIRP / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

$$\text{ERP} = P_{\text{Meas}} + G_T - 2.15$$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively

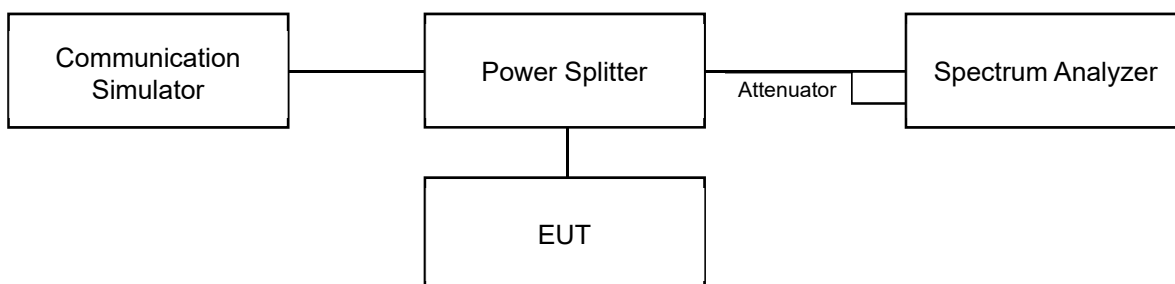
(expressed in the same units as P_{Meas} , e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

6.2 Peak to Average Ratio

6.2.1 Test Setup

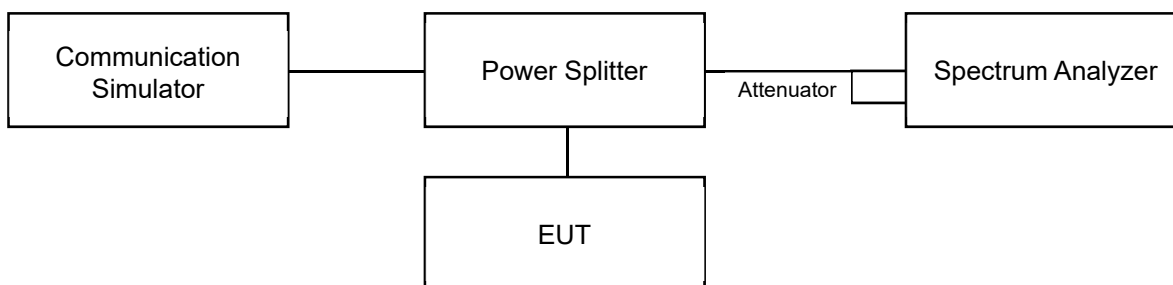


6.2.2 Test Procedure

- Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

6.3 Bandwidth

6.3.1 Test Setup



6.3.2 Test Procedure

For the 26 dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

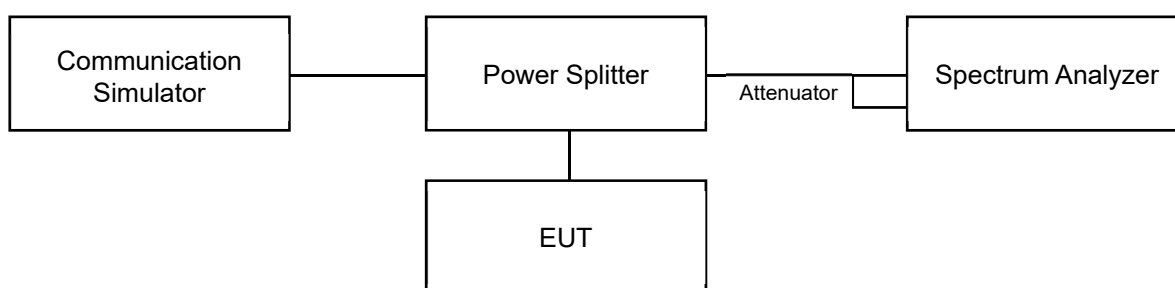
- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- Determine the following reference values: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- Determine the “-X dB amplitude” as equal to (Reference Value - X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
- Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB amplitude” determined in step f). If a marker is below this “-X dB amplitude” value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
- The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

- a. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- c. Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- d. Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- e. If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.
- f. The OBW shall be reported by providing plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

6.4 Conducted Spurious Emissions

6.4.1 Test Setup



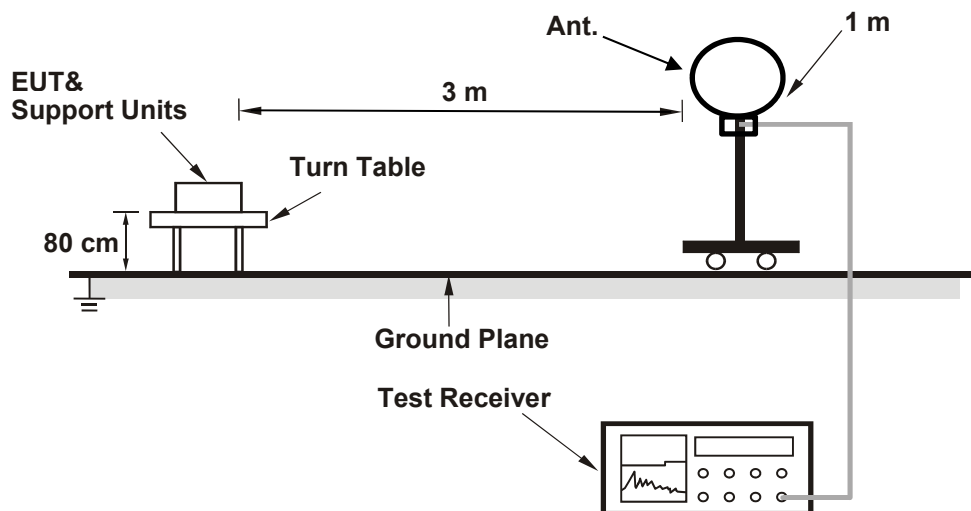
6.4.2 Test Procedure

- a. Measurement refer to ANSI C63.26 section 5.7.
- b. All measurements were done at 3 channels: low, middle and high operational frequency range.
- c. Measuring frequency range is from 9 kHz up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. 10 dB attenuation pad is connected with spectrum.
- d. The fundamental frequency above 1 GHz, the spectrum set RBW = 1 MHz, VBW = 3 MHz, Detector = Average.
- e. The fundamental frequency below 1 GHz, the spectrum set RBW ≥ 100 kHz, VBW $\geq 3 \times$ RBW, Detector = Average.
- f. Measuring frequency band edge, narrow RBW (no less than 1% of the OBW) is used for conducted emission measurement.
- g. For the emissions measurement method, certain channel BW modes demonstrate compliance by integrating with the smaller RBW allowed by the rule.
For example: Where Reference RBW = 1 MHz and a smaller RBW = 100 kHz is used, worst-case integrated BW power = [Max Measured Value (dBm) with RBW = 100 kHz] + $10 \times \log(1000/100)$. To compensate for this integration before comparison to the value, the adjusted reference level offset was increase by 10 dB accordingly.
- h. Record the maximum power value test plot.

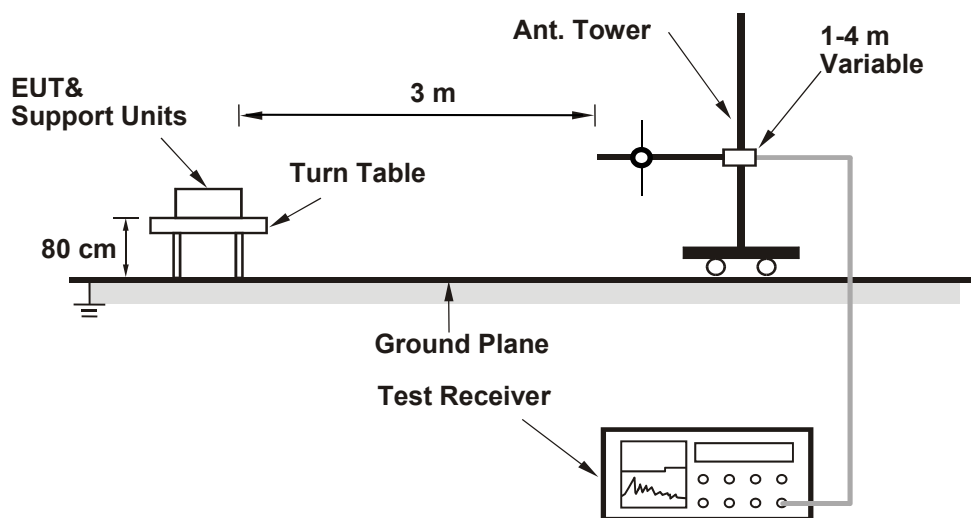
6.5 Radiated Spurious Emissions below 1GHz

6.5.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.5.2 Test Procedure

The EUT is configured to set data modulation and maximum power using WWAN technology.

- a. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- d. Following ANSI C63.26 section 5.5 and 5.2.7
- e. $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- f. $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

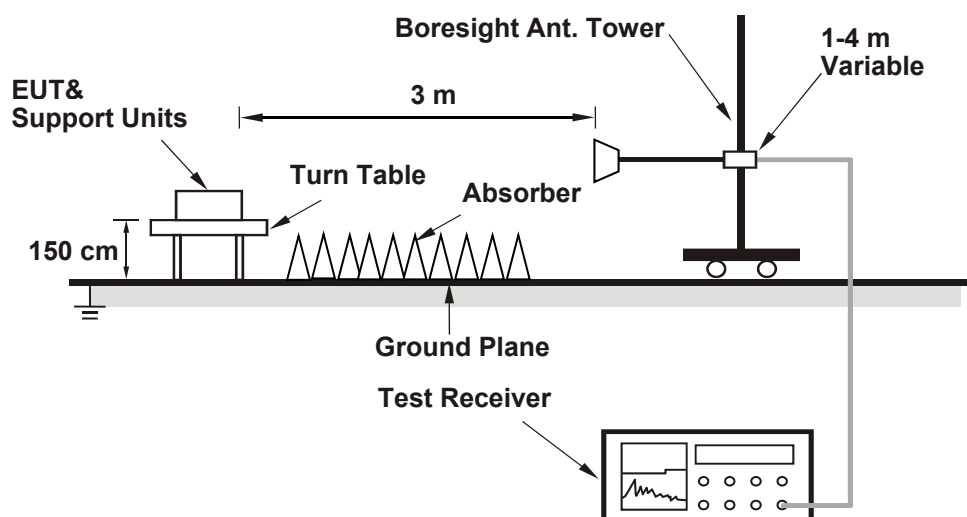
Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.
2. The amplitude of spurious emissions in the range 9 kHz to 30 MHz which are attenuated more than 20 dB below the permissible value need not be reported.

6.6 Radiated Spurious Emissions above 1GHz

6.6.1 Test Setup

For radiated emission above 1 GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.6.2 Test Procedure

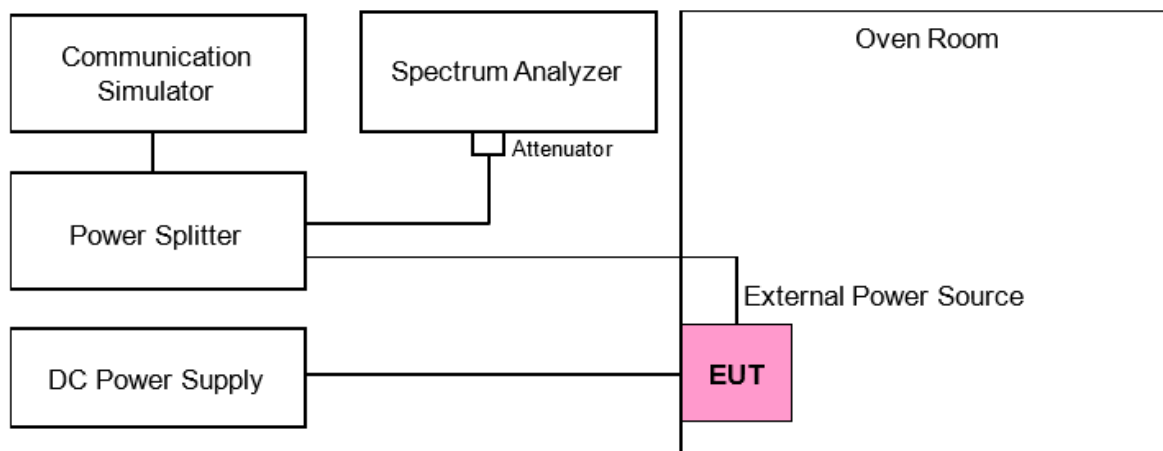
The EUT is configured to set data modulation and maximum power using WWAN technology.

- In the semi-anechoic chamber, EUT placed on the 1.5 m height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- Following ANSI C63.26 section 5.5 and 5.2.7
- $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector = average.

6.7 Frequency Stability

6.7.1 Test Setup



6.7.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^\circ\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Note: The frequency error was recorded frequency error from the communication simulator.

7 Test Results of Test Item

7.1 Maximum EIRP

Input Power:	3.85 Vdc	Environmental Conditions:	23°C, 74% RH	Tested By:	Willy Cheng
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7.1.1 LTE Band 48C

Conducted Output Power (dBm), Output Power: Full Power

Con- figure	Com- bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
		Total														
Intra Band Conti- guous	48C	48	20	QPSK	1	0	55340	3560	48	20	QPSK	1	99	55538	3629.8	10.04
					1	99						1	0			9.82
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	10.10
					1	99						1	0			9.46
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	10.02
					1	99						1	0			9.73
Intra Band Conti- guous	48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3629.8	8.99
					1	99						1	0			8.77
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	9.04
					1	99						1	0			8.44
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	8.94
					1	99						1	0			8.68
Intra Band Conti- guous	48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3629.8	7.90
					1	99						1	0			7.71
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	7.99
					1	99						1	0			7.37
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	7.87
					1	99						1	0			7.67
Intra Band Conti- guous	48C	48	20	256QAM	1	0	55340	3560	48	20	256QAM	1	99	55538	3629.8	6.84
					1	99						1	0			6.65
		48	20	256QAM	1	0	55891	3615.1	48	20	256QAM	1	99	56089	3634.9	6.92
					1	99						1	0			6.32
		48	20	256QAM	1	0	56442	3670.2	48	20	256QAM	1	99	56640	3690	6.82
					1	99						1	0			6.59

Con- figure	Com- bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Conti- guous	48C	48	20	QPSK	50	50	55340	3560	48	20	QPSK	50	50	55538	3629.8	9.99
					50	50						50	50			9.73
		48	20	QPSK	50	50	55891	3615.1	48	20	QPSK	50	50	56089	3634.9	9.89
					50	50						50	50			9.61
		48	20	QPSK	50	50	56442	3670.2	48	20	QPSK	50	50	56640	3690	9.76
					50	50						50	50			9.52
Intra Band Conti- guous	48C	48	20	16QAM	50	50	55340	3560	48	20	16QAM	50	50	55538	3629.8	8.74
					50	50						50	50			8.43
		48	20	16QAM	50	50	55891	3615.1	48	20	16QAM	50	50	56089	3634.9	8.61
					50	50						50	50			8.22
		48	20	16QAM	50	50	56442	3670.2	48	20	16QAM	50	50	56640	3690	8.49
					50	50						50	50			8.08
Intra Band Conti- guous	48C	48	20	64QAM	50	50	55340	3560	48	20	64QAM	50	50	55538	3629.8	7.62
					50	50						50	50			7.28
		48	20	64QAM	50	50	55891	3615.1	48	20	64QAM	50	50	56089	3634.9	7.52
					50	50						50	50			7.22
		48	20	64QAM	50	50	56442	3670.2	48	20	64QAM	50	50	56640	3690	7.36
					50	50						50	50			7.09
Intra Band Conti- guous	48C	48	20	256QAM	50	50	55340	3560	48	20	256QAM	50	50	55538	3629.8	6.52
					50	50						50	50			6.24
		48	20	256QAM	50	50	55891	3615.1	48	20	256QAM	50	50	56089	3634.9	6.42
					50	50						50	50			6.18
		48	20	256QAM	50	50	56442	3670.2	48	20	256QAM	50	50	56640	3690	6.33
					50	50						50	50			6.02

Con- figure	Com- bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
		Total														
Intra Band Conti- guous	48C	48	20	QPSK	100	0	55340	3560	48	20	QPSK	100	0	55538	3629.8	9.97
					100	0						100	0			9.54
		48	20	QPSK	100	0	55891	3615.1	48	20	QPSK	100	0	56089	3634.9	9.92
					100	0						100	0			9.40
		48	20	QPSK	100	0	56442	3670.2	48	20	QPSK	100	0	56640	3690	9.82
					100	0						100	0			9.38
Intra Band Conti- guous	48C	48	20	16QAM	100	0	55340	3560	48	20	16QAM	100	0	55538	3629.8	8.82
					100	0						100	0			8.41
		48	20	16QAM	100	0	55891	3615.1	48	20	16QAM	100	0	56089	3634.9	8.79
					100	0						100	0			8.37
		48	20	16QAM	100	0	56442	3670.2	48	20	16QAM	100	0	56640	3690	8.70
					100	0						100	0			8.26
Intra Band Conti- guous	48C	48	20	64QAM	100	0	55340	3560	48	20	64QAM	100	0	55538	3629.8	7.72
					100	0						100	0			7.34
		48	20	64QAM	100	0	55891	3615.1	48	20	64QAM	100	0	56089	3634.9	7.72
					100	0						100	0			7.31
		48	20	64QAM	100	0	56442	3670.2	48	20	64QAM	100	0	56640	3690	7.64
					100	0						100	0			7.22
Intra Band Conti- guous	48C	48	20	256QAM	100	0	55340	3560	48	20	256QAM	100	0	55538	3629.8	6.57
					100	0						100	0			6.13
		48	20	256QAM	100	0	55891	3615.1	48	20	256QAM	100	0	56089	3634.9	6.52
					100	0						100	0			6.10
		48	20	256QAM	100	0	56442	3670.2	48	20	256QAM	100	0	56640	3690	6.42
					100	0						100	0			6.04

EIRP Power (dBm)

Output Power					
Modulation	Minimum Cond. Power (dBm)	Maximum Cond. Power (dBm)	Minimum EIRP (dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
QPSK	9.46	10.10	10.43	11.07	23.00
16QAM	8.44	9.04	9.41	10.01	23.00
64QAM	7.37	7.99	8.34	8.96	23.00
256QAM	6.32	6.92	7.29	7.89	23.00

Note: EIRP (dBm) = Cond. Power (dBm) + Antenna Gain (dBi) + Array Gain (if applicable)

Conducted Output Power (dBm), Output Power: dBm/10 MHz

Con- figure	Com- bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Conti- guous	48C	48	20	QPSK	1	0	55340	3560	48	20	QPSK	1	99	55538	3629.8	10.00
					1	99						1	0			9.78
		48	20	QPSK	1	0	55891	3615.1	48	20	QPSK	1	99	56089	3634.9	10.02
					1	99						1	0			9.43
		48	20	QPSK	1	0	56442	3670.2	48	20	QPSK	1	99	56640	3690	10.00
					1	99						1	0			9.71
Intra Band Conti- guous	48C	48	20	16QAM	1	0	55340	3560	48	20	16QAM	1	99	55538	3629.8	8.96
					1	99						1	0			8.75
		48	20	16QAM	1	0	55891	3615.1	48	20	16QAM	1	99	56089	3634.9	9.01
					1	99						1	0			8.40
		48	20	16QAM	1	0	56442	3670.2	48	20	16QAM	1	99	56640	3690	8.90
					1	99						1	0			8.64
Intra Band Conti- guous	48C	48	20	64QAM	1	0	55340	3560	48	20	64QAM	1	99	55538	3629.8	7.85
					1	99						1	0			7.66
		48	20	64QAM	1	0	55891	3615.1	48	20	64QAM	1	99	56089	3634.9	7.96
					1	99						1	0			7.35
		48	20	64QAM	1	0	56442	3670.2	48	20	64QAM	1	99	56640	3690	7.84
					1	99						1	0			7.64
Intra Band Conti- guous	48C	48	20	256QAM	1	0	55340	3560	48	20	256QAM	1	99	55538	3629.8	6.81
					1	99						1	0			6.60
		48	20	256QAM	1	0	55891	3615.1	48	20	256QAM	1	99	56089	3634.9	6.89
					1	99						1	0			6.29
		48	20	256QAM	1	0	56442	3670.2	48	20	256QAM	1	99	56640	3690	6.78
					1	99						1	0			6.54

Con- figure	Com- bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Conti- guous	48C	48	20	QPSK	50	50	55340	3560	48	20	QPSK	50	50	55538	3629.8	9.95
					50	50						50	50			9.70
		48	20	QPSK	50	50	55891	3615.1	48	20	QPSK	50	50	56089	3634.9	9.85
					50	50						50	50			9.57
		48	20	QPSK	50	50	56442	3670.2	48	20	QPSK	50	50	56640	3690	9.74
					50	50						50	50			9.50
Intra Band Conti- guous	48C	48	20	16QAM	50	50	55340	3560	48	20	16QAM	50	50	55538	3629.8	8.72
					50	50						50	50			8.38
		48	20	16QAM	50	50	55891	3615.1	48	20	16QAM	50	50	56089	3634.9	8.57
					50	50						50	50			8.20
		48	20	16QAM	50	50	56442	3670.2	48	20	16QAM	50	50	56640	3690	8.43
					50	50						50	50			8.04
Intra Band Conti- guous	48C	48	20	64QAM	50	50	55340	3560	48	20	64QAM	50	50	55538	3629.8	7.58
					50	50						50	50			7.24
		48	20	64QAM	50	50	55891	3615.1	48	20	64QAM	50	50	56089	3634.9	7.48
					50	50						50	50			7.18
		48	20	64QAM	50	50	56442	3670.2	48	20	64QAM	50	50	56640	3690	7.34
					50	50						50	50			7.05
Intra Band Conti- guous	48C	48	20	256QAM	50	50	55340	3560	48	20	256QAM	50	50	55538	3629.8	6.49
					50	50						50	50			6.20
		48	20	256QAM	50	50	55891	3615.1	48	20	256QAM	50	50	56089	3634.9	6.39
					50	50						50	50			6.15
		48	20	256QAM	50	50	56442	3670.2	48	20	256QAM	50	50	56640	3690	6.30
					50	50						50	50			6.01

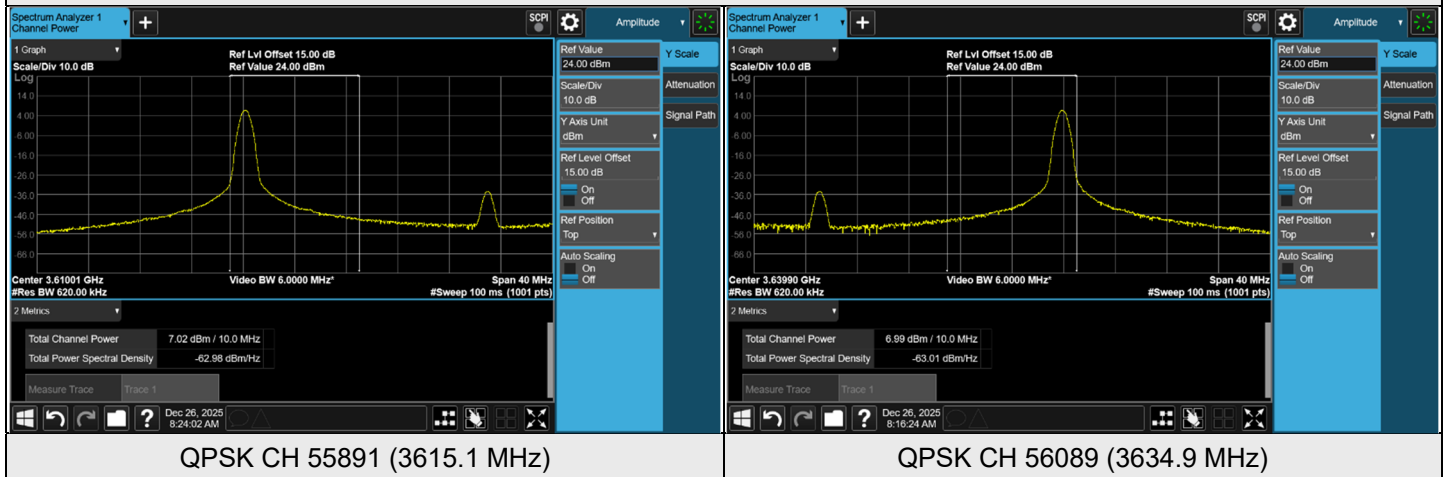
Con- figure	Com- bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
		Total														
Intra Band Conti- guous	48C	48	20	QPSK	100	0	55340	3560	48	20	QPSK	100	0	55538	3629.8	9.92
					100	0						100	0			9.49
		48	20	QPSK	100	0	55891	3615.1	48	20	QPSK	100	0	56089	3634.9	9.82
					100	0						100	0			9.32
		48	20	QPSK	100	0	56442	3670.2	48	20	QPSK	100	0	56640	3690	9.72
					100	0						100	0			9.32
Intra Band Conti- guous	48C	48	20	16QAM	100	0	55340	3560	48	20	16QAM	100	0	55538	3629.8	8.70
					100	0						100	0			8.36
		48	20	16QAM	100	0	55891	3615.1	48	20	16QAM	100	0	56089	3634.9	8.54
					100	0						100	0			8.18
		48	20	16QAM	100	0	56442	3670.2	48	20	16QAM	100	0	56640	3690	8.40
					100	0						100	0			8.01
Intra Band Conti- guous	48C	48	20	64QAM	100	0	55340	3560	48	20	64QAM	100	0	55538	3629.8	7.54
					100	0						100	0			7.24
		48	20	64QAM	100	0	55891	3615.1	48	20	64QAM	100	0	56089	3634.9	7.44
					100	0						100	0			7.16
		48	20	64QAM	100	0	56442	3670.2	48	20	64QAM	100	0	56640	3690	7.32
					100	0						100	0			7.03
Intra Band Conti- guous	48C	48	20	256QAM	100	0	55340	3560	48	20	256QAM	100	0	55538	3629.8	6.47
					100	0						100	0			6.08
		48	20	256QAM	100	0	55891	3615.1	48	20	256QAM	100	0	56089	3634.9	6.37
					100	0						100	0			6.05
		48	20	256QAM	100	0	56442	3670.2	48	20	256QAM	100	0	56640	3690	6.28
					100	0						100	0			6.00

EIRP Power (dBm)

Output Power					
Modulation	Minimum Cond. Power (dBm)	Maximum Cond. Power (dBm)	Minimum EIRP (dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
QPSK	9.43	10.02	10.40	10.99	23.00
16QAM	8.40	9.01	9.37	9.98	23.00
64QAM	7.35	7.96	8.32	8.93	23.00
256QAM	6.29	6.89	7.26	7.86	23.00

Note: EIRP (dBm) = Cond. Power (dBm) + Antenna Gain (dBi) + Array Gain (if applicable)

Spectrum Plot of Worst Value



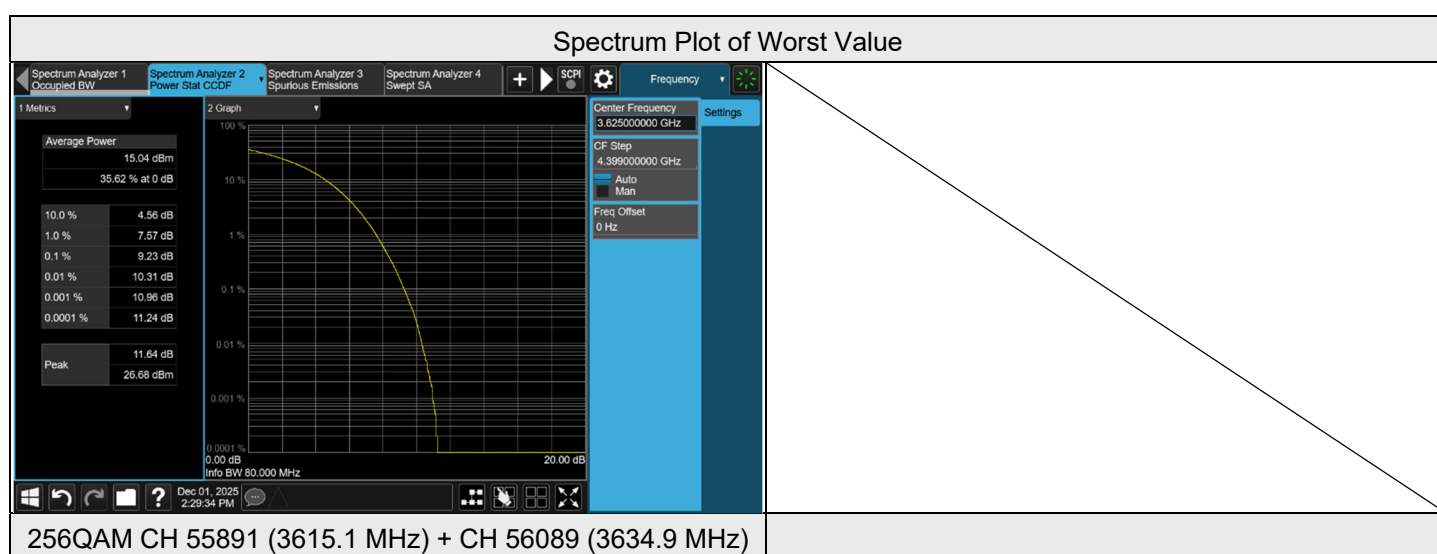
7.2 Peak to Average Ratio

Input Power:	3.85 Vdc	Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang
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7.2.1 LTE Band 48C

Channel Bandwidth: 20 MHz + 20 MHz

Channel	Frequency (MHz)	Peak to Average Ratio (dB)				Limit
		QPSK	16QAM	64QAM	256QAM	
55340+55538	3560+3579.8	7.58	8.78	9.09	8.85	13
55891+56089	3615.1+3634.9	6.94	7.87	8.72	9.23	13
56442+56640	3670.2+3690	8.65	8.65	9.16	8.51	13



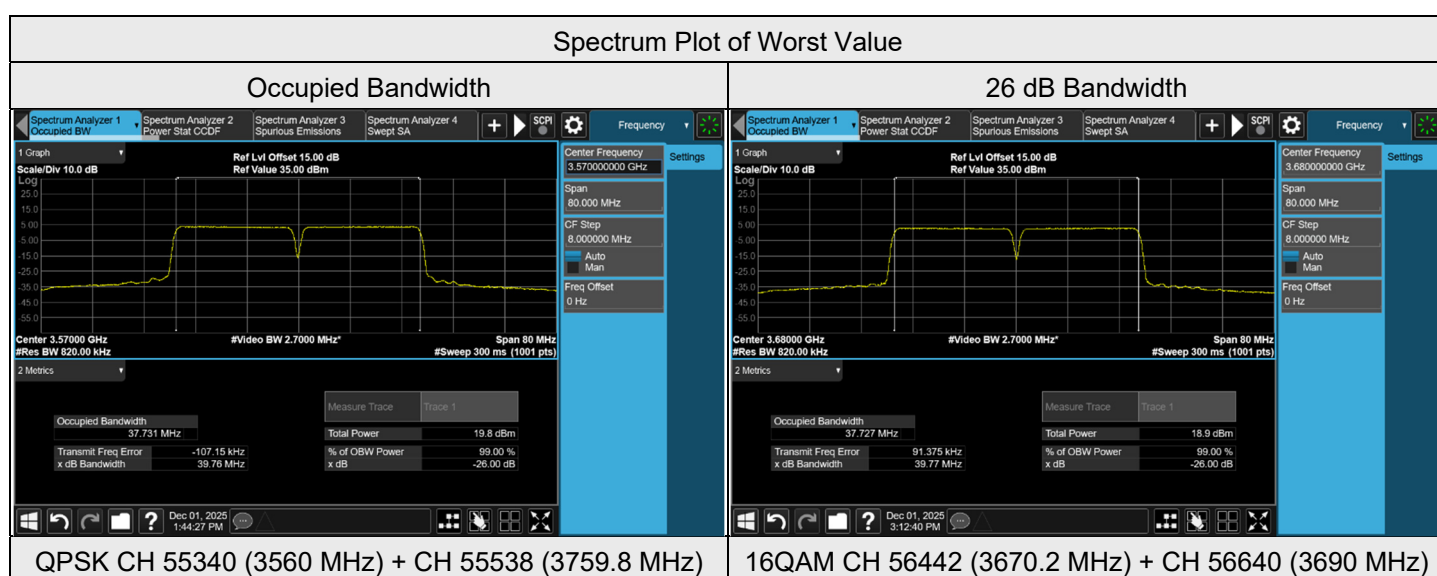
7.3 Bandwidth

Input Power:	3.85 Vdc	Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang
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7.3.1 LTE Band 48C

Channel Bandwidth: 20 MHz + 20 MHz

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)				26 dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM	QPSK	16QAM	64QAM	256QAM
55340+55538	3560+3579.8	37.731	37.705	37.701	37.713	39.76	39.73	39.69	39.75
55891+56089	3615.1+3634.9	37.706	37.680	37.662	37.688	39.77	39.73	39.68	39.72
56442+56640	3670.2+3690	37.723	37.727	37.699	37.705	39.77	39.77	39.73	39.74

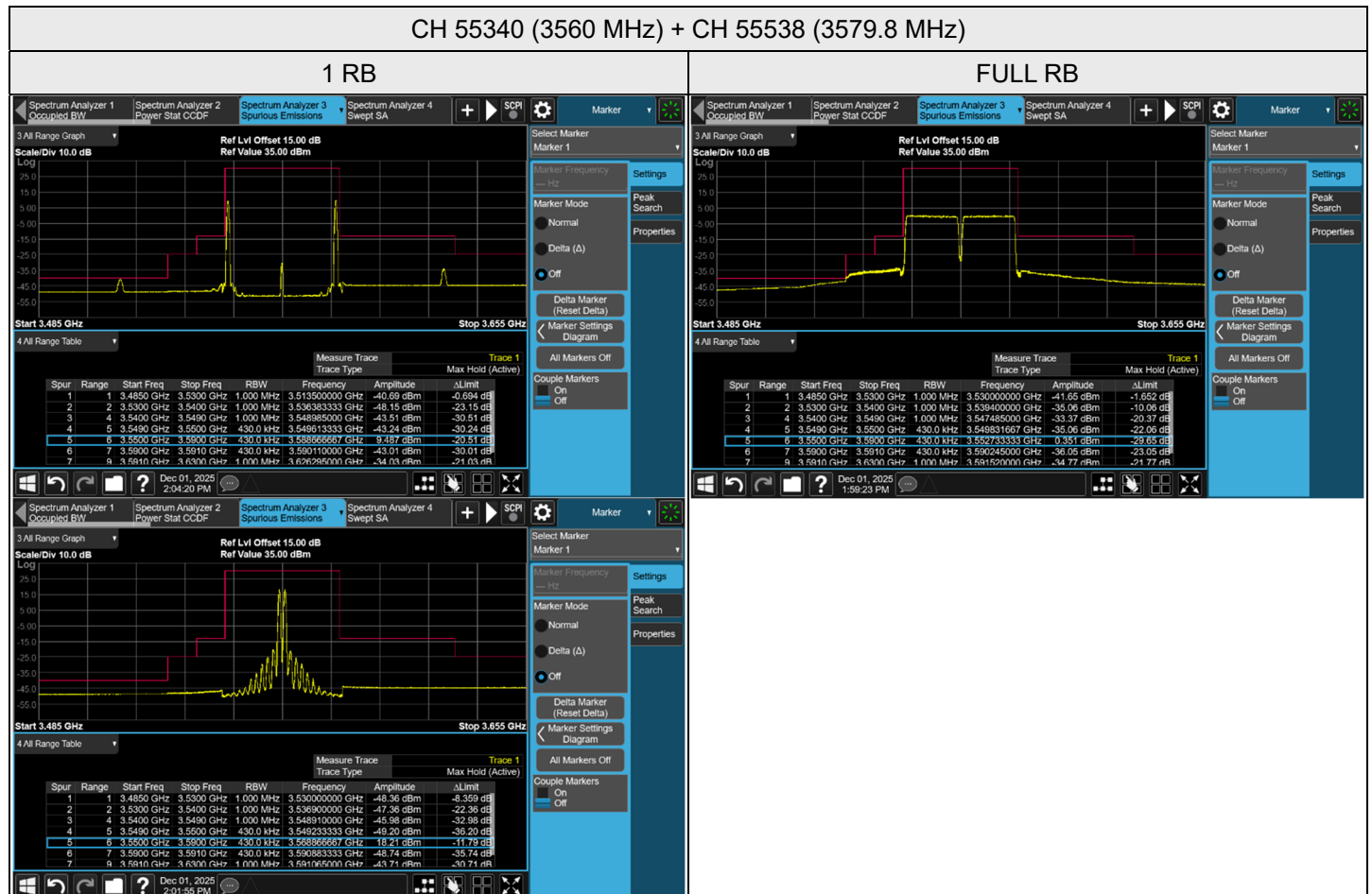


7.4 Conducted Spurious Emissions

Input Power:	3.85 Vdc	Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang
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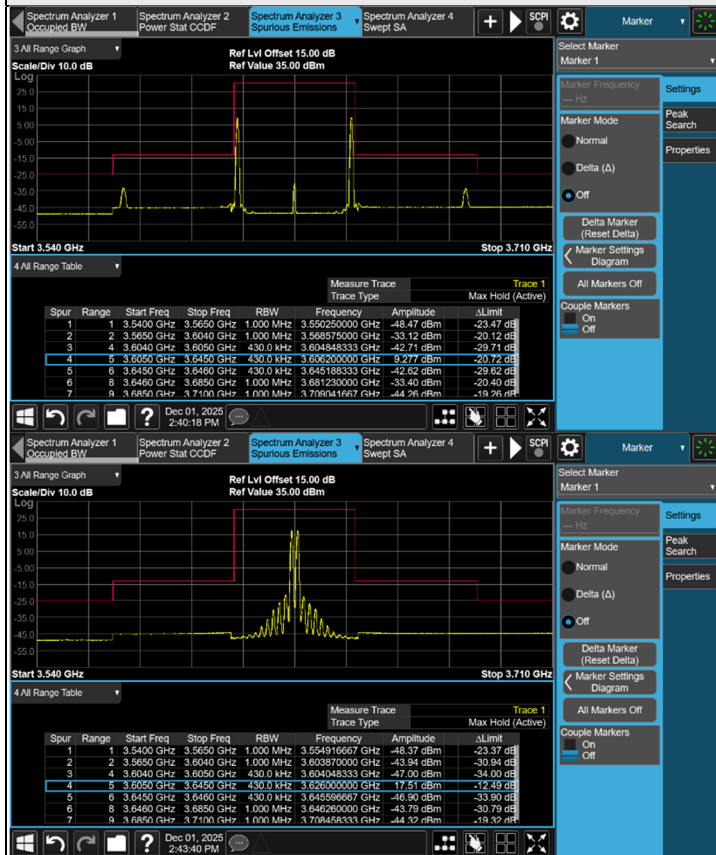
7.4.1 LTE Band 48C

Channel Bandwidth: 20 MHz + 20 MHz

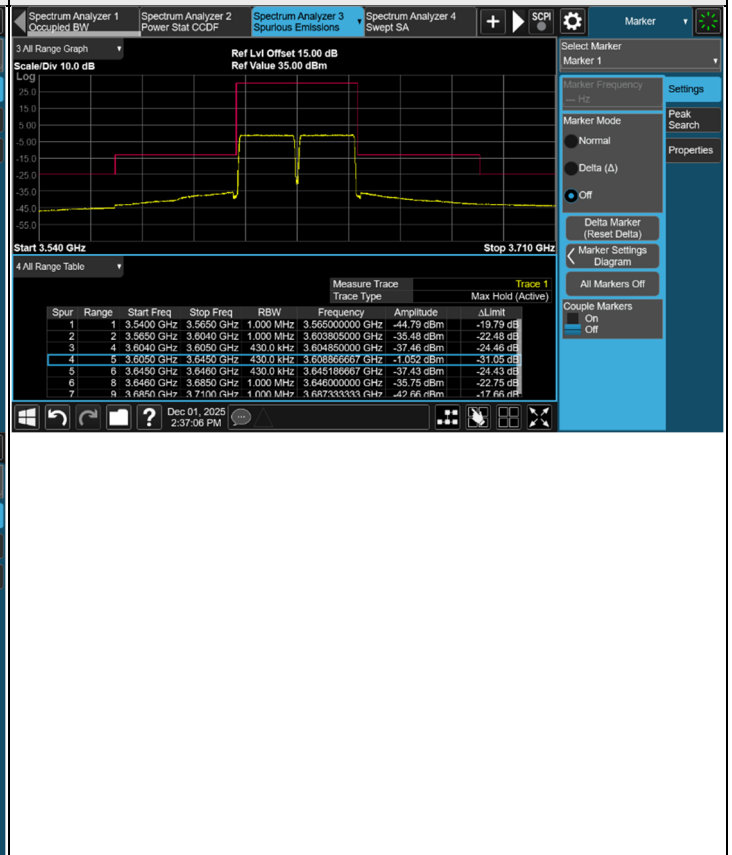


CH 55891 (3615.1 MHz) + CH 56089 (3634.9 MHz)

1 RB

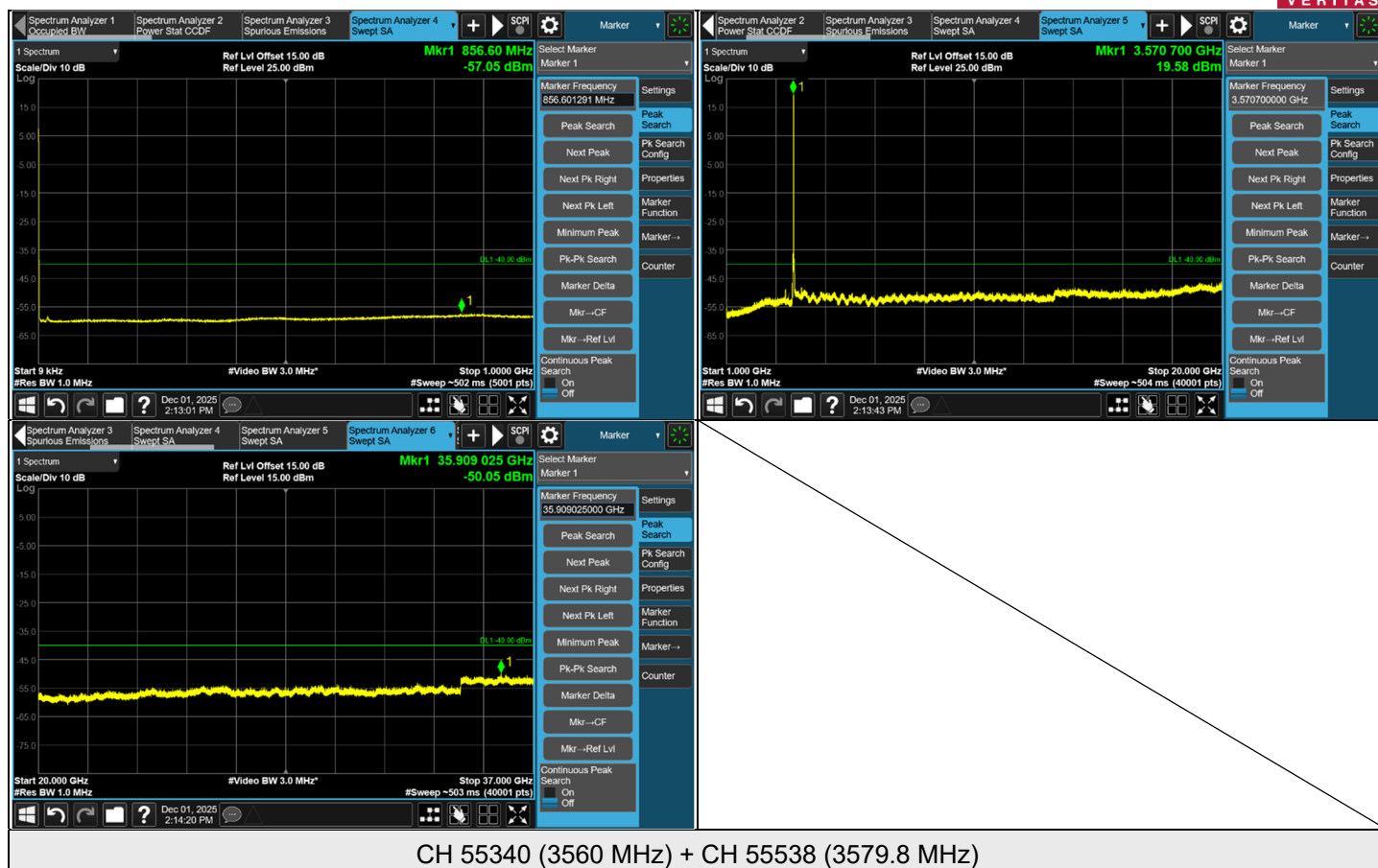


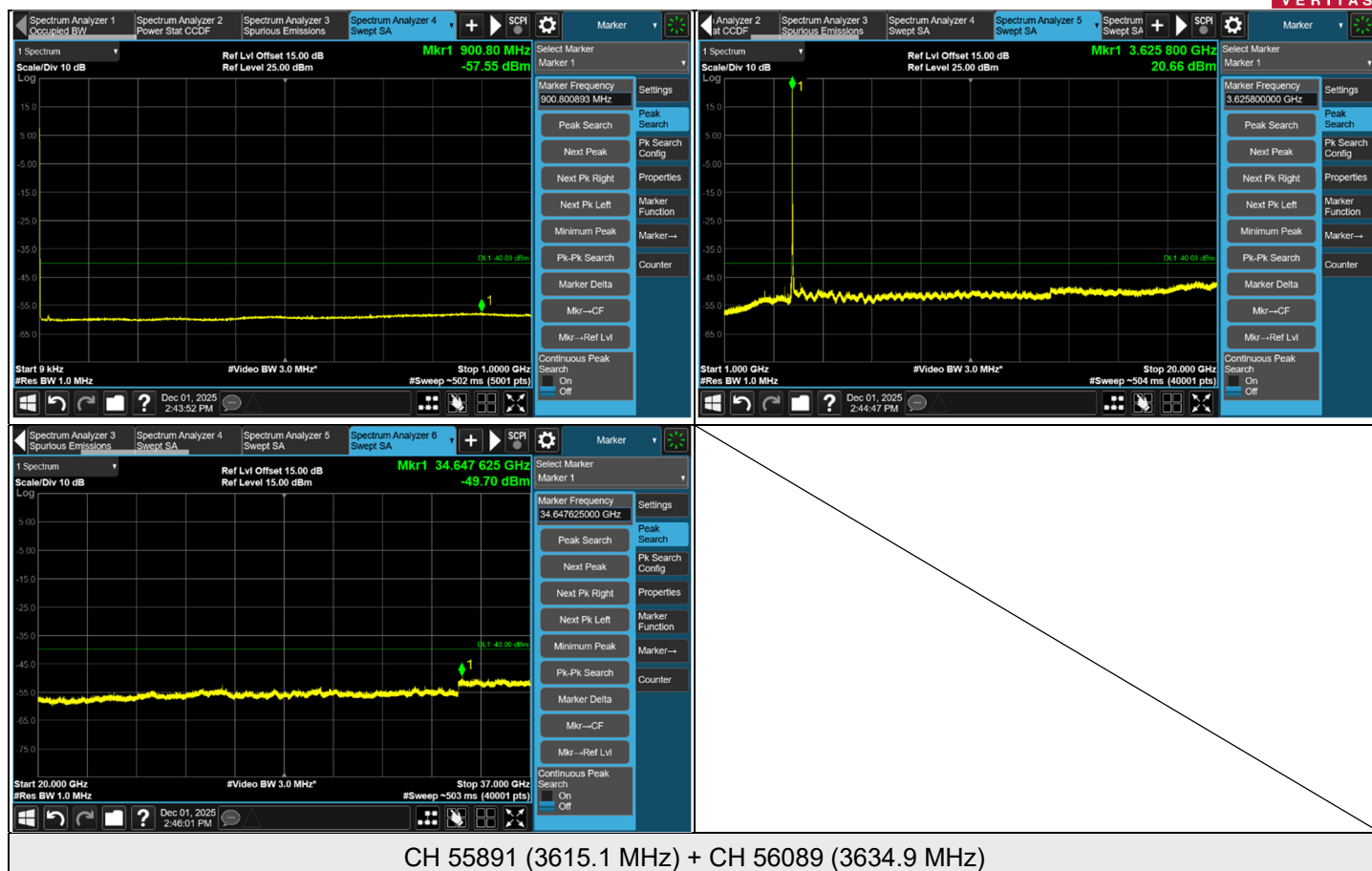
FULL RB

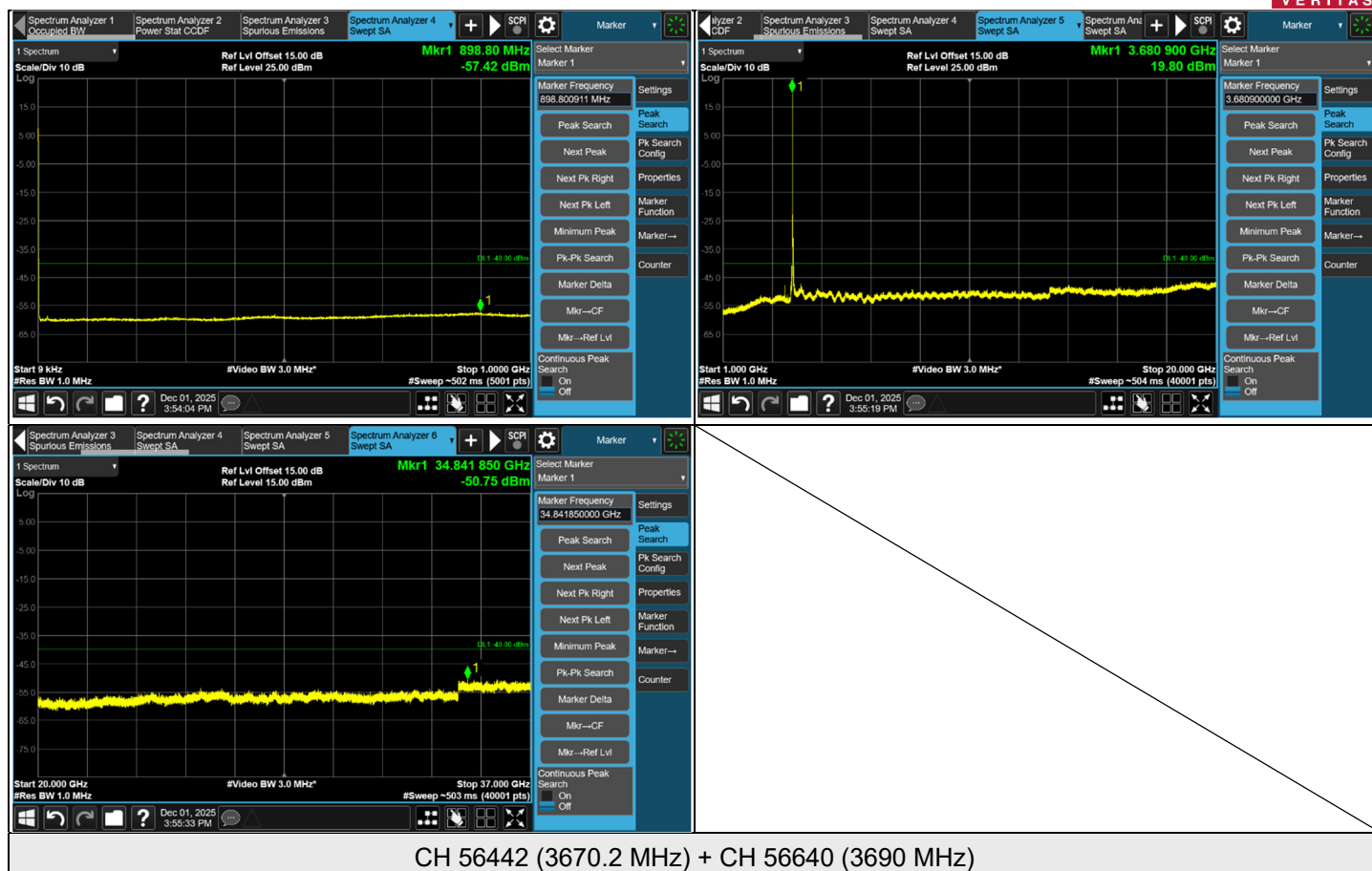


CH 56442 (3670.2 MHz) + CH 56640 (3690 MHz)









7.5 Radiated Spurious Emissions below 1GHz

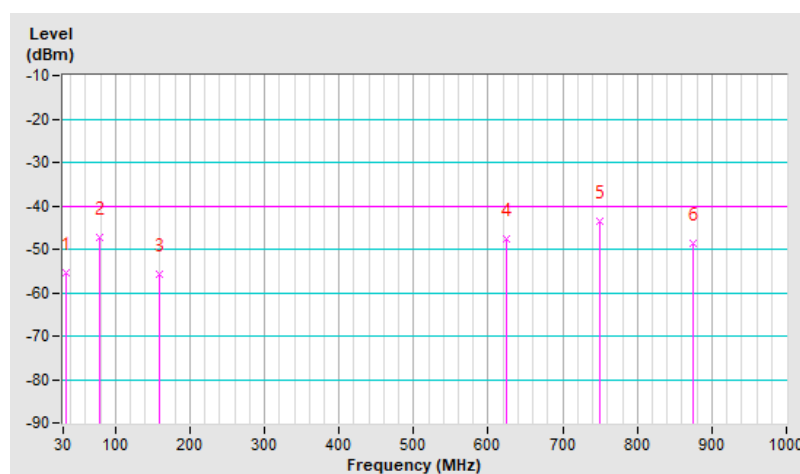
7.5.1 LTE Band 48C

RF Mode	LTE Band 48C Channel Bandwidth: 20 MHz + 20 MHz	Channel	CH 55340 : 3560 MHz + CH 55538 : 3579.80 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	-55.28	-40.00	-15.28	2.00 H	45	53.02	-108.30
2	78.50	-47.25	-40.00	-7.25	1.50 H	18	64.81	-112.06
3	159.01	-55.64	-40.00	-15.64	1.00 H	273	51.85	-107.49
4	624.61	-47.48	-40.00	-7.48	2.00 H	205	51.62	-99.10
5	749.74	-43.50	-40.00	-3.50	1.00 H	217	52.41	-95.91
6	874.87	-48.62	-40.00	-8.62	1.50 H	25	46.71	-95.33

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

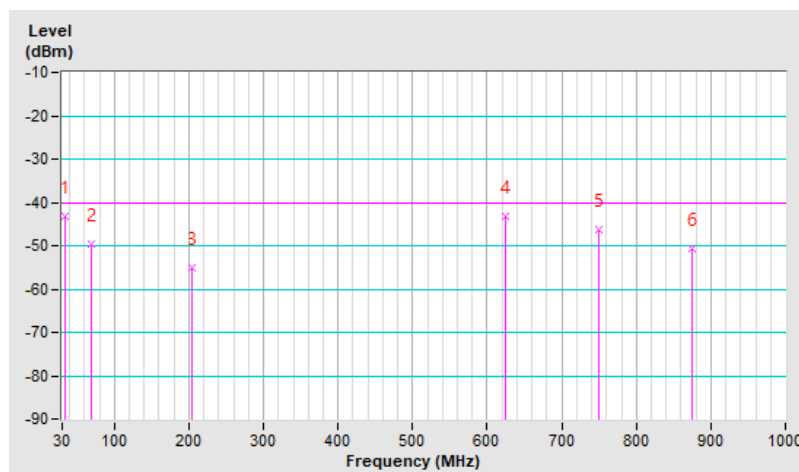


RF Mode	LTE Band 48C Channel Bandwidth: 20 MHz + 20 MHz	Channel	CH 55340 : 3560 MHz + CH 5538 : 3579.80 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	34.85	-43.17	-40.00	-3.17	1.00 V	0	64.82	-107.99
2	69.77	-49.83	-40.00	-9.83	1.50 V	107	59.94	-109.77
3	203.63	-54.93	-40.00	-14.93	1.00 V	318	55.87	-110.80
4	624.61	-43.16	-40.00	-3.16	2.00 V	160	55.94	-99.10
5	749.74	-46.41	-40.00	-6.41	1.00 V	87	49.50	-95.91
6	874.87	-50.63	-40.00	-10.63	1.50 V	116	44.70	-95.33

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.6 Radiated Spurious Emissions above 1GHz

7.6.1 LTE Band 48C

RF Mode	LTE Band 48C Channel Bandwidth: 20 MHz + 20 MHz	Channel	CH 55340 : 3560 MHz + CH 55538 : 3579.80 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7120.00	-43.08	-40.00	-3.08	2.73 H	123	41.85	-84.93
2	7159.60	-43.61	-40.00	-3.61	2.14 H	118	41.24	-84.85
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7120.00	-42.50	-40.00	-2.50	1.63 V	246	42.43	-84.93
2	7159.60	-43.12	-40.00	-3.12	1.57 V	233	41.73	-84.85

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	LTE Band 48C Channel Bandwidth: 20 MHz + 20 MHz	Channel	CH 55891 : 3615.10 MHz + CH 56089 : 3634.90 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7230.20	-42.03	-40.00	-2.03	1.75 H	193	42.75	-84.78
2	7269.80	-43.14	-40.00	-3.14	3.14 H	78	41.73	-84.87
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7230.20	-41.91	-40.00	-1.91	2.73 V	225	42.87	-84.78
2	7269.80	-42.85	-40.00	-2.85	2.62 V	67	42.02	-84.87

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

RF Mode	LTE Band 48C Channel Bandwidth: 20 MHz + 20 MHz	Channel	CH 56442 : 3670.20 MHz + CH 56640 : 3690.00 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	22 °C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7340.40	-42.80	-40.00	-2.80	2.17 H	105	42.10	-84.90
2	7380.00	-43.51	-40.00	-3.51	2.21 H	97	41.35	-84.86
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	7340.40	-42.53	-40.00	-2.53	1.43 V	286	42.37	-84.90
2	7380.00	-43.08	-40.00	-3.08	1.38 V	257	41.78	-84.86

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

7.7 Frequency Stability

Environmental Conditions:	25°C, 68% RH	Tested By:	Noah Chang
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7.7.1 LTE Band 48C

Channel Bandwidth: 20 MHz + 20 MHz

Frequency Stability Versus Voltage				
Voltage (Vdc)	CH 55340 (3560 MHz) + CH 56640 (3690 MHz)			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.60	3560.000004	0.0011	3689.999995	-0.0014
3.85	3560.000002	0.0006	3689.999999	-0.0003
4.30	3560.000005	0.0014	3689.999998	-0.0005

Note: The applicant defined the normal working voltage is from 3.60 to 4.30 Vdc.

Frequency Stability Versus Temperature				
Temperature (°C)	CH 55340 (3560 MHz) + CH 56640 (3690 MHz)			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	3560.000004	0.0011	3690.000002	0.0005
-20	3560.000005	0.0014	3690.000004	0.0011
-10	3559.999996	-0.0011	3690.000001	0.0003
0	3560.000003	0.0008	3689.999995	-0.0014
10	3559.999996	-0.0011	3689.999996	-0.0011
20	3559.999999	-0.0003	3689.999996	-0.0011
30	3560.000001	0.0003	3690.000003	0.0008
40	3560.000001	0.0003	3690.000003	0.0008
50	3560.000004	0.0011	3689.999998	-0.0005

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

The address and road map of all our labs can be found in our web site also.

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