



## TEST REPORT

Product Name: Asset GPS tracker  
FCC ID: 2AUVX-NT68  
Trademark: N/A  
Model Number: NT68E, NT68D, NT68U  
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Sample Received Date: Oct. 14, 2024  
Sample tested Date: Oct. 14, 2024 to Oct. 31, 2024  
Issue Date: Oct. 31, 2024  
Report No.: CTB24101407801RF03  
Test Standards: FCC Part 2, 22, 24E, 27  
Test Results: PASS  
Remark: This is LTE radio test report.

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Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "\*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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(Note: N/A means not applicable)



1.      **VERSION**

Report No.	Issue Date	Description	Approved
CTB24101407801RF03	Oct. 31, 2024	Original	Valid



## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
Conducted output power	Part 2.1046(a)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 22.913(a)(5)/Part27.50(h)(2)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
peak-to-average ratio	Part 27.50(d)	KDB 971168 D01v03r01	PASS
99% & 26dB Occupied Bandwidth	Part 2.1049(h)	KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	Part 2.1053/ Part 22.917(a)/Part 27.53(m) (4)	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Frequency stability	Part 2.1055/Part 27.54	TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

### 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m camber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Receiver Reference Sensitivity level	1.9dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63°C
frequency	1×10 <sup>-7</sup>

#### 4. PRODUCT INFORMATION AND TEST SETUP

##### 4.1 Product Information

Model(s):	NT68E, NT68D, NT68U
Model Description:	All the model are the same circuit and RF module, only the name, appearance and color are different. Test sample model: NT68E
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	FDD-LTE BAND 2:1850-1910MHz FDD-LTE BAND 4:1710-1755MHz FDD-LTE BAND 12: 699-716MHz FDD-LTE BAND 13: 777-787MHz
Max. RF output power:	FDD-LTE BAND 2: 19.68dBm FDD-LTE BAND 4: 19.45dBm FDD-LTE BAND 12: 20.7dBm FDD-LTE BAND 13: 20.42dBm
Type of Modulation:	QPSK, 16QAM
Antenna installation:	Internal antenna
Antenna Gain:	LTE BAND 2: 3.35dBi LTE BAND 4: 1.55dBi LTE BAND 12: -1.16dBi LTE BAND 13: -0.44dBi
Ratings:	DC 5V charging from adapter DC 3.7V by Battery



#### 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

#### 4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note

#### Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

#### 4.4 Test Mode

Test Mode List		
Test Mode	Description	Remark
TM1	FDD-LTE BAND 2	Low, Middle, High Channels
TM2	FDD-LTE BAND 4	Low, Middle, High Channels
TM3	TDD-LTE BAND 12	Low, Middle, High Channels
TM4	TDD-LTE BAND 13	Low, Middle, High Channels

#### 4.5 Test Environment

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Normal Voltage(DC):	3.7V
Normal Temperature(°C)	23
Low Temperature(°C)	0
High Temperature(°C)	40

## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinghe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

### 5.2 Test Instrument Used

No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2025/6/28
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2025/6/28
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2025/6/28
4	Communication test set	R&S	CMW500	108058	V3.5.80	2025/6/28
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2025/6/28
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2025/6/28
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07 (E1962B)	2025/6/28
9	2.4 GHz Filter	Shenxiang	MSF2400-24 83.5MS-1154	20181015001	/	2025/6/30
10	5 GHz Filter	Shenxiang	MSF5150-58 50MS-1155	20181015001	/	2025/6/30
11	Filter	Xingbo	XBLBQ-DZA 120	190821-1-1	/	2025/6/30
12	BT&WI-FI Automatic test software	Microwave	MTS8310	Ver. 2.0.0.0	/	/
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	/	2025/6/28
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	/	2025/6/28
15	234G Automatic test software	Microwave	MTS8200	Ver. 2.0.0.0	/	/
16	966 chamber	C.R.T.	966	/	/	2027/6/21
17	Receiver	R&S	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
18	Amplifier	HP	8447E	2945A02747	/	2025/6/28
19	Amplifier	Agilent	8449B	3008A01838	/	2025/6/28
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/28
21	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2025/6/28



22	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/
23	Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/28
24	loop antenna	ZHINAN	ZN30900A	GTS534	/	/
25	40G Horn antenna	A/H/System	SAS-574	588	/	2025/6/28
26	Amplifier	AEROFLEX	Aeroflex	097	/	2025/6/28
27	Power Metter	KEYSIGHT	N1912AP	N/A	A.05.00	2025/6/28

## 6. RF EXPOSURE

### 6.1 Standard Applicable

According to §1.1307 and §2.1091, §2.1093, the portable transmitter must comply the RF exposure requirements.

### 6.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure report.

## 7. RF OUTPUT POWER

### 7.1 Standard Applicable

According to §22.913(a)(2), the ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

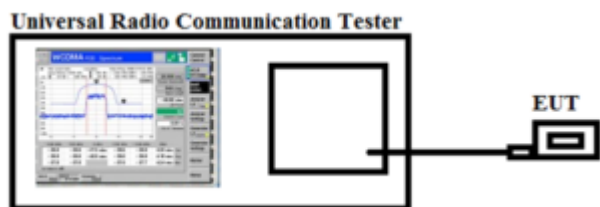
According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d)(4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

According to §27.50(c)(10), portable stations (hand-held devices) in the 698-746 MHz band are limited to 3 watts ERP.

### 7.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.



### 7.3 Summary of Test Results/Plots

Please refer to Appendix 1: Conducted output power  
Test result: Pass

## 8. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER

### 8.1 Standard Applicable

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51, 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.

According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal

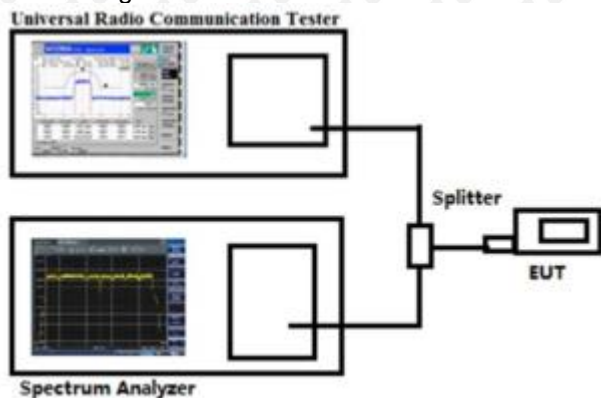
corresponding to the highest PAPR expected during periods of continuous transmission.

### 8.2 Test Procedure

According with KDB 971168

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Configuration for the emission bandwidth testing:



### 8.3 Summary of Test Results

Please refer to Appendix 3: Peak-to-Average Ratio

Test result: Pass

## 9. EMISSION BANDWIDTH

### 9.1 Standard Applicable

According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

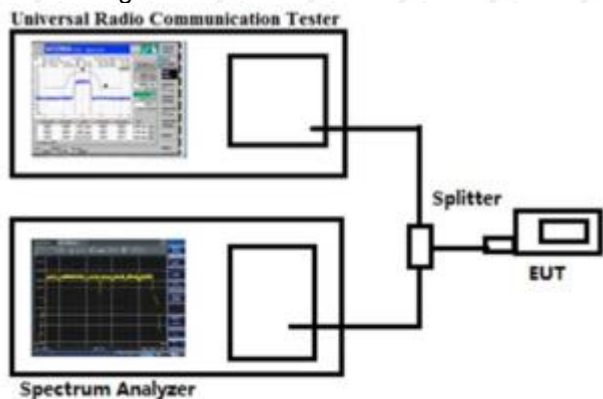
According to §24.238(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 9.2 Test Procedure

According to §22.917(b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Configuration for the emission bandwidth testing:



### 9.3 Summary of Test Results/Plots

Please refer to Appendix 4: 26dB Bandwidth and Occupied Bandwidth  
Test result: Pass



## 10. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL

### 10.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the 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.

According to §27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log(P)$  dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to §27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

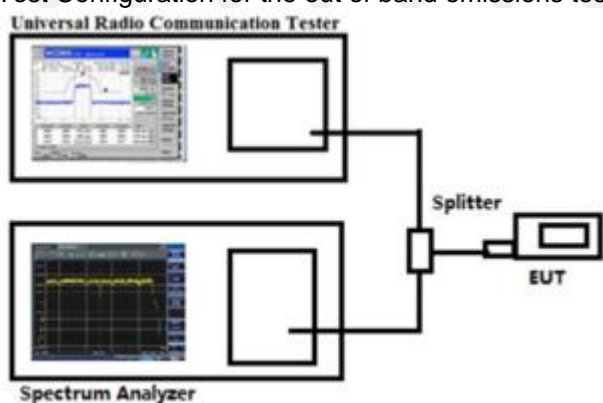
According to §27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB.

According to §27.53(m)(4), for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz.

### 10.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10 th harmonic.

Test Configuration for the out of band emissions testing:



### 10.3 Summary of Test Results/Plots

Please refer to Appendix 5 & 6: Band Edge & Out-of-band emissions

Test result: Pass



## 11. SPURIOUS RADIATED EMISSIONS

### 11.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the 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.

According to §27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log(P)$  dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to §27.53 (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

According to §27.53(g) the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB.



## 11.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA-603-E and ANSI C63.4-2014 measurement procedure.
  2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
  3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
  4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.
- Spurious attenuation limit in dB =  $43 + 10 \log_{10}(\text{power out in Watts})$

## 11.3 Summary of Test Results/Plots

- Note: 1. this EUT was tested in 3 orthogonal positions and the worst case position data was reported.  
2. All test modes (different bandwidth and different modulation) are performed, but only the worst case is recorded in this report.

# QPSK

Band 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1384.65	150	359	-56.89	-13	-43.89	Pass	H
1775.46	144	103	-47.58	-13	-34.58	Pass	H
3873.32	141	138	-46.26	-13	-33.26	Pass	H
5933.90	155	67	-43.37	-13	-30.37	Pass	H
6444.24	158	15	-44.06	-13	-31.06	Pass	H
8137.05	146	105	-42.90	-13	-29.90	Pass	H
1289.92	158	252	-56.24	-13	-43.24	Pass	V
1403.51	150	140	-59.24	-13	-46.24	Pass	V
3626.64	151	141	-51.56	-13	-38.56	Pass	V
3738.75	142	260	-52.72	-13	-39.72	Pass	V
5857.92	147	302	-50.70	-13	-37.70	Pass	V
6491.58	153	255	-44.76	-13	-31.76	Pass	V

Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1275.97	150	331	-57.24	-13	-44.24	Pass	H
1698.74	146	271	-52.19	-13	-39.19	Pass	H
3868.91	150	73	-48.52	-13	-35.52	Pass	H
5923.95	146	312	-44.50	-13	-31.50	Pass	H
6409.90	149	227	-51.27	-13	-38.27	Pass	H
7922.16	151	94	-49.89	-13	-36.89	Pass	H
1147.18	149	205	-54.09	-13	-41.09	Pass	V
1467.50	148	268	-59.19	-13	-46.19	Pass	V
3573.61	147	126	-52.41	-13	-39.41	Pass	V
3888.39	148	34	-53.44	-13	-40.44	Pass	V
5887.11	150	118	-46.25	-13	-33.25	Pass	V
6545.37	150	7	-50.57	-13	-37.57	Pass	V

Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1338.28	147	349	-59.06	-13	-46.06	Pass	H
1599.13	150	126	-51.26	-13	-38.26	Pass	H
3815.98	154	303	-46.16	-13	-33.16	Pass	H
5948.95	149	164	-40.55	-13	-27.55	Pass	H
6568.49	155	279	-41.54	-13	-28.54	Pass	H
8006.19	152	2	-46.22	-13	-33.22	Pass	H
1307.46	149	65	-57.00	-13	-44.00	Pass	V
1432.22	153	316	-57.88	-13	-44.88	Pass	V
3537.48	146	228	-50.17	-13	-37.17	Pass	V
3945.35	146	82	-48.49	-13	-35.49	Pass	V
5852.61	146	318	-42.40	-13	-29.40	Pass	V
6656.45	149	146	-47.69	-13	-34.69	Pass	V

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Band 2 18607 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1261.41	145	345	-59.12	-13	-46.12	Pass	H
1713.04	152	26	-47.98	-13	-34.98	Pass	H
3864.70	150	150	-50.65	-13	-37.65	Pass	H
5982.82	147	231	-45.92	-13	-32.92	Pass	H
6616.59	152	123	-43.42	-13	-30.42	Pass	H
7901.17	151	173	-39.88	-13	-26.88	Pass	H
1194.67	151	299	-50.44	-13	-37.44	Pass	V
1382.33	154	276	-55.38	-13	-42.38	Pass	V
3515.34	149	266	-51.61	-13	-38.61	Pass	V
3866.19	155	188	-52.26	-13	-39.26	Pass	V
5776.34	148	3	-45.53	-13	-32.53	Pass	V
6674.83	150	271	-52.20	-13	-39.20	Pass	V



Band 2 18900 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1369.61	146	121	-53.28	-13	-41.45	Pass	H
1676.76	152	195	-51.52	-13	-37.85	Pass	H
3790.74	151	107	-44.83	-13	-35.2	Pass	H
5979.37	146	188	-41.95	-13	-30.39	Pass	H
6420.52	148	359	-43.12	-13	-32.24	Pass	H
8112.94	146	262	-39.85	-13	-30.22	Pass	H
1254.04	150	272	-60.27	-13	-44.9	Pass	V
1286.48	149	90	-55.30	-13	-43.63	Pass	V
3600.44	155	155	-50.23	-13	-35.94	Pass	V
3832.63	148	87	-49.31	-13	-36.01	Pass	V
5872.90	153	236	-43.98	-13	-33.75	Pass	V
6550.75	150	358	-44.85	-13	-32.41	Pass	V

Band 2 19193 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1247.59	147	130	-55.88	-13	-42.88	Pass	H
1769.93	149	329	-50.66	-13	-37.66	Pass	H
3810.78	152	54	-44.59	-13	-31.59	Pass	H
5909.28	147	289	-42.72	-13	-29.72	Pass	H
6457.25	147	86	-38.57	-13	-25.57	Pass	H
7982.60	146	306	-43.68	-13	-30.68	Pass	H
1192.29	149	270	-54.57	-13	-41.57	Pass	V
1430.28	150	257	-61.70	-13	-48.70	Pass	V
3621.84	147	250	-50.91	-13	-37.91	Pass	V
3867.12	150	22	-47.92	-13	-34.92	Pass	V
5862.98	149	171	-51.06	-13	-38.06	Pass	V
6631.29	147	231	-47.94	-13	-34.94	Pass	V

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Band 4 19957 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1275.24	148	55	-53.70	-13	-40.70	Pass	H
1746.30	154	353	-45.86	-13	-32.86	Pass	H
3966.15	146	130	-47.81	-13	-34.81	Pass	H
6012.72	151	304	-48.52	-13	-35.52	Pass	H
6622.69	148	325	-43.86	-13	-30.86	Pass	H
7929.28	146	83	-44.82	-13	-31.82	Pass	H
1102.11	150	197	-50.36	-13	-37.36	Pass	V
1337.06	146	356	-53.60	-13	-40.60	Pass	V
3671.33	150	312	-52.76	-13	-39.76	Pass	V
3948.96	145	334	-52.17	-13	-39.17	Pass	V
5910.76	146	212	-42.60	-13	-29.60	Pass	V
6526.73	149	332	-49.87	-13	-36.87	Pass	V

Band 4 20175 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1386.30	147	284	-57.36	-13	-44.36	Pass	H
1790.13	152	244	-48.00	-13	-35.00	Pass	H
3945.18	150	170	-45.55	-13	-32.55	Pass	H
5835.35	145	163	-43.62	-13	-30.62	Pass	H
6459.08	154	165	-40.40	-13	-27.40	Pass	H
8002.54	147	316	-47.52	-13	-34.52	Pass	H
1249.84	153	277	-55.15	-13	-42.15	Pass	V
1454.18	153	162	-56.65	-13	-43.65	Pass	V
3585.16	148	47	-45.96	-13	-32.96	Pass	V
3855.14	150	274	-46.46	-13	-33.46	Pass	V
5854.65	152	58	-46.41	-13	-33.41	Pass	V
6608.00	146	213	-48.24	-13	-35.24	Pass	V

Band 4 20393 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1356.64	149	165	-52.39	-13	-39.39	Pass	H
1631.07	146	208	-45.69	-13	-32.69	Pass	H
3954.89	146	4	-45.26	-13	-32.26	Pass	H
5812.96	150	198	-41.44	-13	-28.44	Pass	H
6465.07	146	341	-47.08	-13	-34.08	Pass	H
8106.98	150	235	-39.26	-13	-26.26	Pass	H
1153.75	146	292	-53.60	-13	-40.60	Pass	V
1514.44	150	158	-55.47	-13	-42.47	Pass	V
3620.12	149	55	-51.60	-13	-38.60	Pass	V
3929.45	150	319	-49.84	-13	-36.84	Pass	V
5733.87	146	118	-45.01	-13	-32.01	Pass	V
6497.12	150	155	-48.84	-13	-35.84	Pass	V

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Band 4 19957 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1368.87	150	78	-53.55	-13	-40.55	Pass	H
1766.83	149	291	-53.88	-13	-40.88	Pass	H
3842.83	151	213	-53.22	-13	-40.22	Pass	H
5825.54	150	89	-48.96	-13	-35.96	Pass	H
6469.63	151	329	-50.03	-13	-37.03	Pass	H
8090.87	148	138	-49.81	-13	-36.81	Pass	H
1145.29	149	99	-54.64	-13	-41.64	Pass	V
1451.11	148	217	-54.50	-13	-41.50	Pass	V
3500.32	150	12	-49.17	-13	-36.17	Pass	V
3873.01	150	137	-50.13	-13	-37.13	Pass	V
5715.41	146	356	-48.54	-13	-35.54	Pass	V
6486.52	146	95	-45.80	-13	-32.80	Pass	V



Band 4 20175 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1316.65	150	142	-53.41	-13	-40.41	Pass	H
1646.79	146	280	-53.73	-13	-40.73	Pass	H
3812.60	150	330	-51.04	-13	-38.04	Pass	H
5837.21	146	194	-44.80	-13	-31.80	Pass	H
6487.52	149	260	-50.99	-13	-37.99	Pass	H
8028.55	151	31	-47.03	-13	-34.03	Pass	H
1188.84	149	4	-51.97	-13	-38.97	Pass	V
1357.47	148	257	-63.72	-13	-50.72	Pass	V
3538.42	147	55	-50.88	-13	-37.88	Pass	V
3860.27	148	273	-56.11	-13	-43.11	Pass	V
5816.00	150	136	-53.60	-13	-40.60	Pass	V
6600.82	150	16	-49.01	-13	-36.01	Pass	V

Band 4 20393 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1320.72	149	156	-55.05	-13	-42.05	Pass	H
1599.66	149	170	-47.98	-13	-34.98	Pass	H
3743.09	149	127	-48.32	-13	-35.32	Pass	H
5893.22	146	42	-42.15	-13	-29.15	Pass	H
6481.81	147	69	-45.16	-13	-32.16	Pass	H
7905.88	151	110	-43.54	-13	-30.54	Pass	H
1161.61	148	61	-49.96	-13	-36.96	Pass	V
1310.20	147	266	-55.48	-13	-42.48	Pass	V
3478.04	148	303	-51.83	-13	-38.83	Pass	V
3899.52	149	195	-46.78	-13	-33.78	Pass	V
5780.93	147	323	-46.14	-13	-33.14	Pass	V
6492.69	146	325	-44.57	-13	-31.57	Pass	V

Note:

- 1) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

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Band 12 23017 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1333.68	151	115	-59.69	-13	-46.69	Pass	H
1613.63	142	220	-47.88	-13	-34.88	Pass	H
3844.06	147	312	-48.31	-13	-35.31	Pass	H
5852.76	146	228	-44.70	-13	-31.70	Pass	H
6476.37	146	167	-45.39	-13	-32.39	Pass	H
7998.14	150	179	-41.99	-13	-28.99	Pass	H
1284.35	143	95	-52.61	-13	-39.61	Pass	V
1444.81	159	101	-57.85	-13	-44.85	Pass	V
3457.34	148	305	-51.96	-13	-38.96	Pass	V
3924.23	155	52	-52.41	-13	-39.41	Pass	V
5892.13	155	160	-47.45	-13	-34.45	Pass	V
6470.77	149	217	-44.73	-13	-31.73	Pass	V
Band 12 23095 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1385.21	150	206	-58.68	-13	-45.68	Pass	H
1763.95	146	13	-48.83	-13	-35.83	Pass	H
3804.17	150	280	-52.20	-13	-39.20	Pass	H
5853.20	146	153	-47.85	-13	-34.85	Pass	H
6375.12	149	179	-47.74	-13	-34.74	Pass	H
8083.98	151	53	-51.45	-13	-38.45	Pass	H
1329.62	149	36	-56.48	-13	-43.48	Pass	V
1439.89	148	195	-60.17	-13	-47.17	Pass	V
3656.95	147	197	-55.52	-13	-42.52	Pass	V
3926.01	148	237	-52.12	-13	-39.12	Pass	V
5767.83	150	347	-50.78	-13	-37.78	Pass	V
6608.30	150	8	-48.10	-13	-35.10	Pass	V

Band 12 23173 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1245.92	147	38	-55.58	-13	-42.58	Pass	H
1617.87	153	274	-49.23	-13	-36.23	Pass	H
3880.46	152	167	-45.49	-13	-32.49	Pass	H
5918.66	154	57	-38.29	-13	-25.29	Pass	H
6594.36	150	85	-43.29	-13	-30.29	Pass	H
7959.69	149	188	-44.14	-13	-31.14	Pass	H
1270.44	152	168	-59.13	-13	-46.13	Pass	V
1376.14	149	67	-59.69	-13	-46.69	Pass	V
3584.08	151	349	-50.86	-13	-37.86	Pass	V
3902.67	155	257	-49.35	-13	-36.35	Pass	V
5812.54	153	330	-41.52	-13	-28.52	Pass	V
6655.27	147	222	-48.65	-13	-35.65	Pass	V

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Band 12 23017 channel/BW1.4(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1368.94	145	242	-61.14	-13	-48.14	Pass	H
1709.36	154	164	-50.46	-13	-37.46	Pass	H
3879.00	147	355	-51.13	-13	-38.13	Pass	H
5955.74	146	160	-47.38	-13	-34.38	Pass	H
6548.74	153	247	-46.25	-13	-33.25	Pass	H
8000.30	145	311	-44.53	-13	-31.53	Pass	H
1149.40	145	303	-51.97	-13	-38.97	Pass	V
1442.10	149	262	-57.19	-13	-44.19	Pass	V
3521.95	153	182	-49.84	-13	-36.84	Pass	V
3876.19	152	170	-50.08	-13	-37.08	Pass	V
5823.54	148	325	-44.53	-13	-31.53	Pass	V
6648.01	154	342	-50.47	-13	-37.47	Pass	V



Band 12 23095 channel/BW1.4(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1398.97	151	207	-50.99	-13	-41.45	Pass	H
1710.74	149	273	-49.36	-13	-37.85	Pass	H
3942.76	154	197	-50.00	-13	-35.2	Pass	H
5997.20	150	314	-44.19	-13	-30.39	Pass	H
6440.10	145	165	-47.03	-13	-32.24	Pass	H
7986.98	153	262	-42.65	-13	-30.22	Pass	H
1201.45	146	135	-57.39	-13	-44.9	Pass	V
1434.99	145	42	-57.59	-13	-43.63	Pass	V
3558.79	150	268	-50.18	-13	-35.94	Pass	V
3883.17	153	69	-46.66	-13	-36.01	Pass	V
5895.51	149	219	-45.76	-13	-33.75	Pass	V
6611.15	146	115	-45.46	-13	-32.41	Pass	V
Band 12 23173 channel/BW1.4(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1390.09	152	208	-56.56	-13	-43.56	Pass	H
1747.67	155	323	-52.20	-13	-39.20	Pass	H
3959.45	147	12	-41.97	-13	-28.97	Pass	H
5968.42	148	24	-44.39	-13	-31.39	Pass	H
6468.63	145	227	-43.73	-13	-30.73	Pass	H
8042.79	147	81	-44.35	-13	-31.35	Pass	H
1139.60	151	48	-53.16	-13	-40.16	Pass	V
1512.97	147	135	-58.50	-13	-45.50	Pass	V
3642.08	155	218	-51.50	-13	-38.50	Pass	V
3857.31	154	66	-53.20	-13	-40.20	Pass	V
5805.49	146	211	-49.09	-13	-36.09	Pass	V
6469.84	152	114	-44.20	-13	-31.20	Pass	V

Note:

3) Scan from 9kHz to 40GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

4) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

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Band 13 23025 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1305.32	149	165	-55.68	-25	-30.68	Pass	H
1702.13	146	208	-51.08	-25	-26.08	Pass	H
3907.82	146	4	-49.21	-25	-24.21	Pass	H
5987.57	150	198	-42.17	-25	-17.17	Pass	H
6427.76	146	341	-43.90	-25	-18.90	Pass	H
8129.85	150	235	-45.81	-25	-20.81	Pass	H
1230.92	146	292	-51.78	-25	-26.78	Pass	V
1398.46	150	158	-59.89	-25	-34.89	Pass	V
3553.69	149	55	-54.32	-25	-29.32	Pass	V
3737.92	150	319	-46.08	-25	-21.08	Pass	V
5846.37	146	118	-42.51	-25	-17.51	Pass	V
6518.59	150	155	-47.01	-25	-22.01	Pass	V
Band 13 23230 channel/BW 5(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1426.96	149	165	-56.05	-25	-31.05	Pass	H
1662.05	146	208	-49.03	-25	-24.03	Pass	H
3884.17	146	4	-46.92	-25	-21.92	Pass	H
5824.82	150	198	-44.87	-25	-19.87	Pass	H
6574.57	146	341	-42.56	-25	-17.56	Pass	H
7998.94	150	235	-43.03	-25	-18.03	Pass	H
1265.06	146	292	-55.69	-25	-30.69	Pass	V
1516.56	150	158	-58.91	-25	-33.91	Pass	V
3506.07	149	55	-49.80	-25	-24.80	Pass	V
3838.28	150	319	-48.77	-25	-23.77	Pass	V
5769.97	146	118	-47.34	-25	-22.34	Pass	V
6630.09	150	155	-43.96	-25	-18.96	Pass	V

Band 13 23255 channel/BW 5(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1356.50	149	165	-54.51	-25	-29.51	Pass	H
1651.60	146	208	-46.69	-25	-21.69	Pass	H
3893.61	146	4	-45.26	-25	-20.26	Pass	H
5910.44	150	198	-40.46	-25	-15.46	Pass	H
6441.53	146	341	-47.38	-25	-22.38	Pass	H
8146.37	150	235	-40.12	-25	-15.12	Pass	H
1138.65	146	292	-55.72	-25	-30.72	Pass	V
1383.85	150	158	-54.48	-25	-29.48	Pass	V
3593.56	149	55	-47.14	-25	-22.14	Pass	V
3739.32	150	319	-47.09	-25	-22.09	Pass	V
5818.03	146	118	-42.42	-25	-17.42	Pass	V
6601.19	150	155	-44.62	-25	-19.62	Pass	V

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Band 13 23025 channel/BW 5(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1269.21	149	165	-50.52	-25	-25.52	Pass	H
1695.07	146	208	-44.88	-25	-19.88	Pass	H
3972.86	146	4	-45.47	-25	-20.47	Pass	H
5830.71	150	198	-39.01	-25	-14.01	Pass	H
6532.99	146	341	-45.31	-25	-20.31	Pass	H
8011.75	150	235	-42.27	-25	-17.27	Pass	H
1223.19	146	292	-55.37	-25	-30.37	Pass	V
1417.33	150	158	-59.93	-25	-34.93	Pass	V
3455.42	149	55	-50.90	-25	-25.90	Pass	V
3823.35	150	319	-48.57	-25	-23.57	Pass	V
5795.64	146	118	-49.13	-25	-24.13	Pass	V
6494.86	150	155	-49.05	-25	-24.05	Pass	V



Band 13 23230 channel/BW 5(middle channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1272.34	154	213	-53.77	-25	-28.77	Pass	H
1799.97	153	183	-47.23	-25	-22.23	Pass	H
3820.16	154	146	-42.64	-25	-17.64	Pass	H
5927.55	152	164	-43.62	-25	-18.62	Pass	H
6459.49	151	196	-45.77	-25	-20.77	Pass	H
8009.82	155	152	-40.47	-25	-15.47	Pass	H
1172.68	150	46	-55.95	-25	-30.95	Pass	V
1498.94	151	238	-61.56	-25	-36.56	Pass	V
3591.19	150	254	-49.46	-25	-24.46	Pass	V
3789.28	146	261	-45.17	-25	-20.17	Pass	V
5748.41	154	34	-45.33	-25	-20.33	Pass	V
6509.89	150	257	-44.24	-25	-19.24	Pass	V
Band 13 23255 channel/BW 5(highest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1250.45	149	165	-56.78	-25	-31.78	Pass	H
1615.87	146	208	-45.77	-25	-20.77	Pass	H
3868.84	146	4	-42.71	-25	-17.71	Pass	H
5838.76	150	198	-43.36	-25	-18.36	Pass	H
6534.02	146	341	-44.39	-25	-19.39	Pass	H
8004.08	150	235	-42.50	-25	-17.50	Pass	H
1123.34	146	292	-52.88	-25	-27.88	Pass	V
1379.22	150	158	-58.32	-25	-33.32	Pass	V
3468.78	149	55	-52.65	-25	-27.65	Pass	V
3849.75	150	319	-50.25	-25	-25.25	Pass	V
5711.19	146	118	-46.47	-25	-21.47	Pass	V
6500.92	150	155	-44.54	-25	-19.54	Pass	V

Note:

5) Scan from 9kHz to 40GHz, the disturbance above 13GHz and below 1GHz are attenuated more than 20 dB below the applicable limit and not required to be reported, the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

6) Tested with all kind of bandwidth, RB Size and RB Offset, Found the 1.4MHz with full RB were the worst case; and then Only the worst case is recorded in the report.

## 12. FREQUENCY STABILITY

### 12.1 Standard Applicable

According to §22.355, §24.235, §27.54 the limit is 2.5ppm.

### 12.2 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

### 12.3 Summary of Test Results/Plots

Note: 1.Normal Voltage NV=DC 3.7V; Low Voltage LV=DC 3.33V; High Voltage HV=DC 4.07V

Please refer to Appendix 2: Frequency Stability

Test result: Pass

※※※※※ END OF REPORT ※※※※※