



RADIO TEST REPORT

Report No.:STS2112062W03

Issued for

Pitpatpet Ltd

5 Brooklands Avenue, Cambridge, CB2 8BB, United Kingdom

Product Name:	Dog GPS Tracker
Brand Name:	PitPat
Model Name:	PP04
Series Model:	N/A
FCC ID:	2AGYZ-PP04
Test Standard:	47 CFR Part 2, 22, 24(E), 27

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Shenzhen STS Test Services Co., Ltd.
A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ,
Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China
TEL: +86-755 3688 6288 FAX: +86-755 3688 6277 E-mail:sts@stsapp.com



**TEST RESULT CERTIFICATION**

Applicant's Name: Pitpatpet Ltd
Address: 5 Brooklands Avenue, Cambridge, CB2 8BB, United Kingdom
Manufacturer's Name: Pitpatpet Ltd
Address: 5 Brooklands Avenue, Cambridge, CB2 8BB, United Kingdom

Product Description

Product Name: Dog GPS Tracker
Brand Name: PitPat
Model Name: PP04
Series Model: N/A
Test Standards: 47 CFR Part 2, 22, 24(E), 27
Test Procedure: KDB 971168 D01 v03r01, ANSI C63.26 2015

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test:
Date of receipt of test item: 09 Dec. 2021
Date (s) of performance of tests ..: 09 Dec. 2021 ~ 15 Apr. 2022
Date of Issue: 15 Apr. 2022
Test Result: Pass

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sean she)

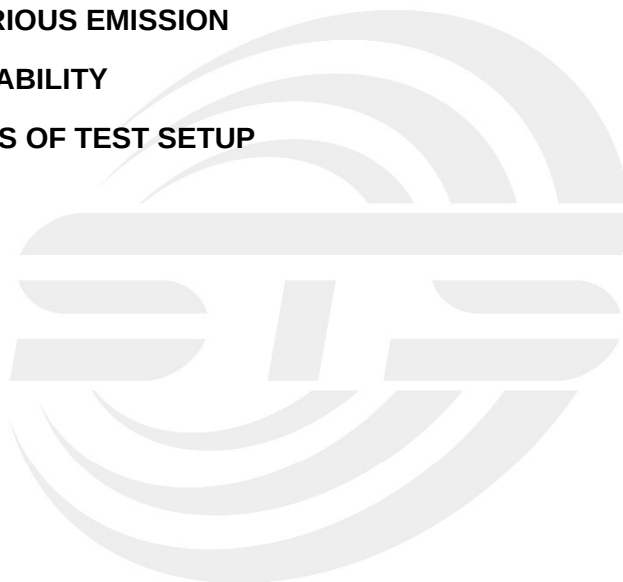
Authorized Signatory :

(Bovey Yang)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	15 Apr. 2022	STS2112062W03	ALL	Initial Issue





1. TEST FACTORY & MEASUREMENT UNCERTAINTY

1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 30-1GHz	$\pm 5.6\text{dB}$
4	All emissions, radiated 1G-6GHz	$\pm 5.5\text{dB}$
5	All emissions, radiated >6G	$\pm 5.8\text{dB}$
6	Conducted Emission (9KHz-150KHz)	$\pm 3.37\text{dB}$
7	Conducted Emission (150KHz-30MHz)	$\pm 3.83\text{dB}$



2. GENERAL INFORMATION

2.1 TECHNICAL SPECIFICATIONS AND REGULATIONS

2.1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Name	Dog GPS Tracker
Trade Name	PitPat
Model Name	PP04
Series Model	N/A
Model Difference	N/A
Frequency Bands	U.S. Bands: CAT-M FDD Band 2 CAT-M FDD Band 4 CAT-M FDD Band 5 CAT-M FDD Band 12 CAT-M FDD Band 13
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested.
Antenna	PCB
Antenna gain	0 dBi
Battery parameter	Rated Voltage: DC 3.8V Charge Limit Voltage: DC 4.2V Capacity:550mAh
Adapter:	Input: DC 5V 2A, DC 9V 1.67A Output: 5W/7.5W/10W
Extreme Vol. Limits	3.1V to 4.2V (Nominal 3.8V)
Extreme Temp. Tolerance	-30°C to +50°C
Hardware version number	R1.00
Software version number	R1.00



2.1.2 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Product Specification Subjective To This Standard	
Tx Frequency	CAT-M Band 2:1850~1910MHz CAT-M Band 4:1710~1755MHz CAT-M Band 5:824~849MHz CAT-M Band 12:699~716MHz CAT-M Band 13:777~787MHz
Rx Frequency	CAT-M Band 2:1930 ~1990MHz CAT-M Band 4:2110~2155MHz CAT-M Band 5:869~894MHz CAT-M Band 12:729~746MHz CAT-M Band 13:746~756MHz
Bandwidth	CAT-M Band 2: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz CAT-M Band 4: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz CAT-M Band 5: 1.4MHz / 3MHz / 5MHz / 10MHz CAT-M Band 12: 1.4MHz / 3MHz / 5MHz / 10MHz CAT-M Band 13: 5MHz / 10MHz
Maximum Output Power	CAT-M Band 2: 23.52 dBm CAT-M Band 4: 23.55 dBm CAT-M Band 5: 23.62 dBm CAT-M Band 12: 23.74 dBm CAT-M Band 13: 23.43 dBm
Type of Modulation	QPSK /16QAM



2.1.3 EMISSION DESIGNATOR

CAT-M Band 2	Emission Designator	Emission Designator
BW(MHz)	(99%OBW)QPSK	(99%OBW)16QAM
1.4	1M10G7D	1M10W7D
3	1M10G7D	1M10W7D
5	1M12G7D	1M11W7D
10	1M12G7D	1M12W7D
15	1M14G7D	1M15W7D
20	1M15G7D	1M16W7D
CAT-M Band 4	Emission Designator	Emission Designator
BW(MHz)	(99%OBW)QPSK	(99%OBW)16QAM
1.4	1M10G7D	1M10W7D
3	1M10G7D	1M10W7D
5	1M11G7D	1M11W7D
10	1M12G7D	1M12W7D
15	1M14G7D	1M14W7D
20	1M16G7D	1M16W7D
CAT-M Band 5	Emission Designator	Emission Designator
BW(MHz)	(99%OBW)QPSK	(99%OBW)16QAM
1.4	1M10G7D	1M10W7D
3	1M10G7D	1M11W7D
5	1M11G7D	1M10W7D
10	1M11G7D	1M12W7D
CAT-M Band 12	Emission Designator	Emission Designator
BW(MHz)	(99%OBW)QPSK	(99%OBW)16QAM
1.4	1M10G7D	1M10W7D
3	1M10G7D	1M11W7D
5	1M10G7D	1M11W7D
10	1M12G7D	1M12W7D
CAT-M Band 13	Emission Designator	Emission Designator
BW(MHz)	(99%OBW)QPSK	(99%OBW)16QAM
5	1M12G7D	1M11W7D
10	1M12G7D	1M13W7D



2.1.4 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 v03r01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power. Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Remark:

1. The mark 'v' means that this configuration is chosen for testing
2. The mark '-' means that this bandwidth is not supported.
3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated.

ITEMS	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v			v	v	v	v	v	v	v	v
	12	v	v	v	v			v	v	v	v	v	v	v	v
	13			v	v			v	v	v	v	v		v	
Peak&Avera Ratio	2	v	v	v	v	v	v	v	v	v		v		v	
	4	v	v	v	v	v	v	v	v	v		v		v	
	5	v	v	v	v			v	v	v		v		v	
	12	v	v	v	v			v	v	v		v		v	
	13			v	v			v	v	v		v		v	
26dB&99% Bandwidth	2	v	v	v	v	v	v	v	v			v		v	
	4	v	v	v	v	v	v	v	v			v		v	
	5	v	v	v	v			v	v			v		v	
	12	v	v	v	v			v	v			v		v	
	13			v	v			v	v			v		v	
Conducted Band Edge	2	v	v	v	v	v	v	v	v	v		v	v		v
	4	v	v	v	v	v	v	v	v	v		v	v		v
	5	v	v	v	v			v	v	v		v	v		v
	12	v	v	v	v			v	v	v		v	v		v
	13			v	v			v	v	v		v	v		v
Conducted Spurious Emission	2	v	v	v	v	v	v	v	v	v		v	v		v
	4	v	v	v	v	v	v	v	v	v		v	v		v
	5	v	v	v	v			v	v	v		v	v		v
	12	v	v	v	v			v	v	v		v	v		v
	13			v	v			v	v	v		v	v		v
Frequency Stability	2				v			v				v		v	
	4				v			v				v		v	
	5				v			v				v		v	
	12				v			v				v		v	
	13				v			v				v		v	



E.R.P.& E.I.R.P.	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v			v	v	v	v	v	v	v	v	v
	12	v	v	v	v			v	v	v	v	v	v	v	v	v
	13			v	v			v	v	v	v	v		v		
Radiated Spurious Emission	2	v	v	v	v	v	v	v		v			v	v	v	v
	4	v	v	v	v	v	v	v		v			v	v	v	v
	5	v	v	v	v			v		v			v	v	v	v
	12	v	v	v	v			v		v			v	v	v	v
	13			v	v			v		v				v		





2.1.5 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for filing to comply with the 47 CFR Part 2, 22, 24(E), 27.

2.1.6 SPECIAL ACCESSORIES

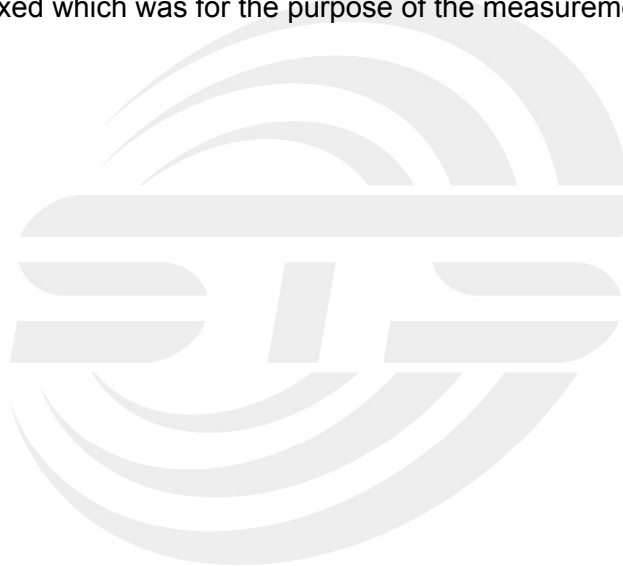
The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with eut intended for fcc grant together.

2.1.7 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.1.8 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.





2.1.9 CONFIGURATION OF EUT SYSTEM

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

E-1
EUT

Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	Length	Note
N/A	N/A	N/A	N/A	N/A

Note:

(1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.1.10 MEASUREMENT INSTRUMENTS

The radiated emission testing was performed according to the procedures of ANSI C63.26 2015 and FCC CFR 47 rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Signal Generator	Agilent	83752A	3610A02740	2021.09.30	2022.09.29
Wireless Communications Test Set	R&S	CMW 500	131428	2022.03.01	2023.02.28
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
Bilog Antenna	TESEQ	CBL6111D	45873	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1343	2020.10.12	2022.10.11
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Pre-Amplifier(0.1M-3GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2021.09.30	2022.09.29
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2021.09.28	2022.09.27
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	BULUN	BL410-E/18.905			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Universal Radio communication tester	R&S	CMU200	111058	2021.09.29	2022.09.28
Wireless Communications Test Set	R&S	CMW 500	131428	2022.03.01	2023.02.28
Signal Analyzer	Agilent	N9020A	MY52440124	2022.03.01	2023.02.28
Temperature& Humidity test chamber	Safety test	AG80L	171200018	2022.03.01	2023.02.28
Programmable power supply	Agilent	E3642A	MY40002025	2021.10.08	2022.10.07
Temperature & Humidity	SW-108	SuWei	N/A	2022.03.02	2023.03.01
Test SW	FARAD	LZ-RF /LzRf-3A3			



2.1.11 MEASUREMENT RESULTS EXPLANATION EXAMPLE

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF Cable Loss + Attenuator Factor.



3. CONDUCTED OUTPUT POWER&RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

3.1.1 MEASUREMENT METHOD

CONDUCTED OUTPUT POWER:

A system simulator was used to establish communication with the eut. Its parameters were set to force the eut transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

Configuration follows KDB 971168 D01 v03r01.

C63.26 2015 Section 5.2.5.5.

In many cases, RF output power limits are specified in terms of the ERP or the EIRP. Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are defined as the product of the power supplied to the antenna and its gain (relative to a dipole antenna in the case of ERP, and relative to an isotropic antenna in the case of EIRP); however, when working in decibels (i.e., logarithmic scale), the ERP and EIRP represent the sum of the transmit antenna gain (in dBd or dBi, respectively) and the conducted RF output power (expressed in dB relative to watts or milliwatts). The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

(1) $ERP \text{ or } EIRP = P_{Meas} + GT$

$ERP = EIRP - 2.15$

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

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

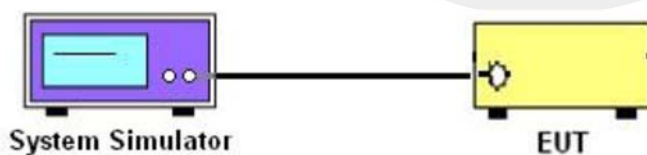
For devices utilizing multiple antennas, see 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.

The following equations demonstrate the mathematical relationship between ERP and EIRP:

a) $ERP = EIRP - 2.15$, where ERP and EIRP are expressed in consistent units.

b) $EIRP = ERP + 2.15$, where ERP and EIRP are expressed in consistent units.

3.1.2 TEST SETUP



3.1.3 TEST PROCEDURES

1. The transmitter output port was connected to system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest/middle/highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.1.4 TEST RESULTS

Note: The test data please reference to attachment "STS2112062W03_Appendix CAT-M".

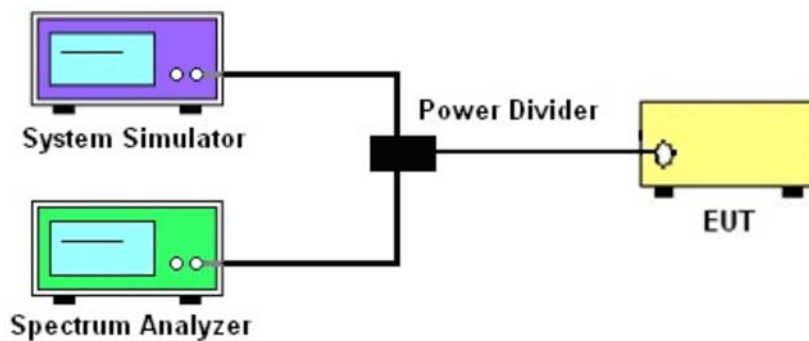
4. PEAK-TO-AVERAGE RATIO

4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1.3 to measure the total peak power and record as PPK. Use one of the applicable procedures presented 4.1.3 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:
 $PAPR (dB) = PPK (dBm) - PAvg (dBm)$.

4.1.2 TEST SETUP



4.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7 and ANSI C63.26 2015 Section 5.2.6.
2. The EUT was connected to spectrum and system simulator via a power divider
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Set the test probe and measure the peak and average power of the spectrum analyzer
5. Record the deviation as Peak to Average Ratio.

4.1.4 TEST RESULTS

Note: The test data please reference to attachment “STS2112062W03_Appendix CAT-M”.

5. OCCUPIED BANDWIDTH

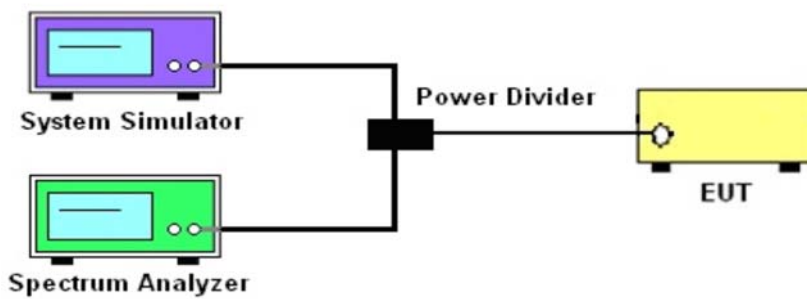
5.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

5.1.1 MEASUREMENT METHOD

1. The occupied bandwidth is 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 transmitted power.

2. The 26 db emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 db below the maximum in-band spectral density of the modulated signal. spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

5.1.2 TEST SETUP



5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 4.2 and 4.3.
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Set the test probe and measure the Occupied Bandwidth of the spectrum analyzer.
5. Measure and record the Occupied Bandwidth from the Spectrum Analyzer.

5.1.4 MEASUREMENT RESULT

Note: The test data please reference to attachment "STS2112062W03_Appendix CAT-M".



6. CONDUCTED BAND EDGE

6.1 DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

6.1.1 MEASUREMENT METHOD

1. §22.917(a)

For operations in the 824 – 849 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

2. §24.238 (a)

For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 1MHz bandwidth. However, 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

3. §27.53 (h)

For operations in the 1710 – 1755 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

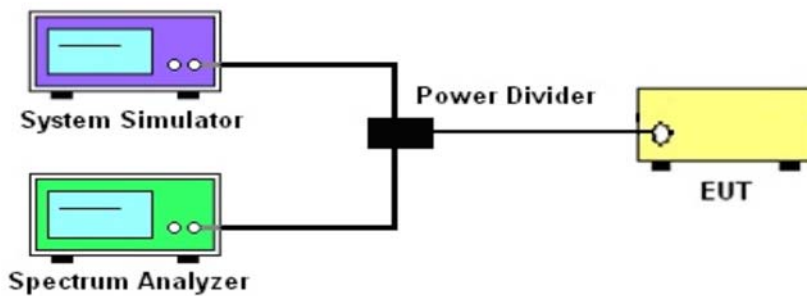
4. §27.53(m)(4)

For operations in the 2500 MHz ~ 2570 MHz band this section, 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 that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5. §27.53 (g)

For operations in the 698 -746 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

6.1.2 TEST SETUP



6.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0 and ANSI C63.26 2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS/AVG detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm}.$$

Band 7:

$$= P(W) - [55 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)}$$

$$= -25\text{dBm}.$$

6.1.4 MEASUREMENT RESULT

Note: The test data please reference to attachment "STS2112062W03_Appendix CAT-M".

7. CONDUCTED SPURIOUS EMISSION

7.1 DESCRIPTION OF CONDUCTED SPURIOUS EMISSION MEASUREMENT

7.1.1 MEASUREMENT METHOD

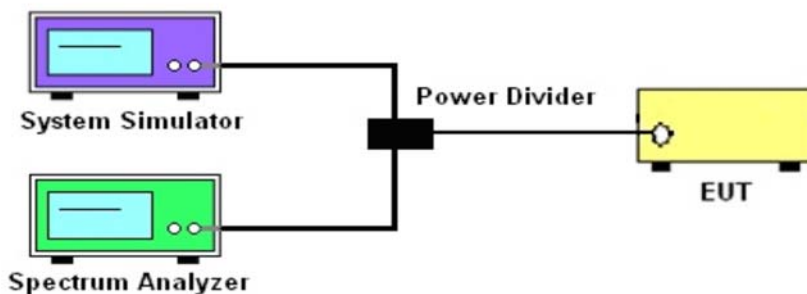
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 7:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

7.1.2 TEST SETUP



7.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0 and ANSI C63.26 2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement
4. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10 \log(P)] \text{ (dB)} = [30 + 10 \log(P)] \text{ (dBm)} - [43 + 10 \log(P)] \text{ (dB)}$
 $= -13 \text{ dBm}$.
 For Band 7: $P(W) - [43 + 10 \log(P)] \text{ (dB)} = -25 \text{ dBm}$

7.1.4 TEST RESULTS

Note: The test data please reference to attachment "STS2112062W03_Appendix CAT-M".

8. RADIATED SPURIOUS EMISSION

8.1 DESCRIPTION OF RADIATED SPURIOUS EMISSION

8.1.1 MEASUREMENT METHOD

The radiated spurious emission was measured by substitution method according to ANSI C63.26 2015. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 7 The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

8.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = Rx \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + Gain \text{ (dBi)} - 107 \text{ (dBuV to dBm)}$ The SA is calibrated using following setup.

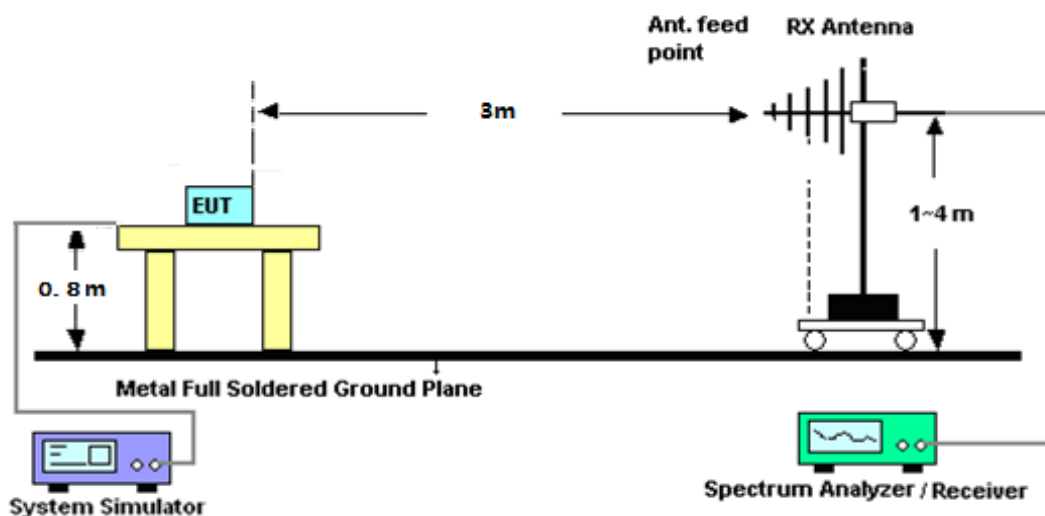
b) EUT was placed on 1.5 m non-conductive stand at a 3 m test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 m from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic measured with peak detector and 1MHz bandwidth.

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

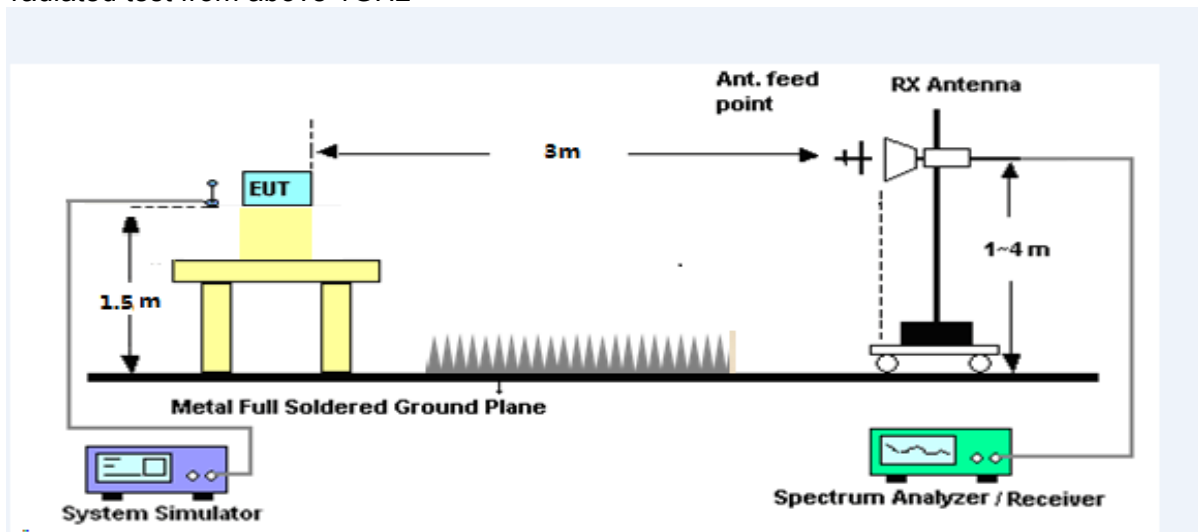
The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:

Power=PMea+ARpl

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



8.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 Section 7 and ANSI C63.26 2015 Section 5.5.
2. The EUT was placed on a rotatable wooden table with 1.5 meter above ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm

For Band 7:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= [30 + 10\log(P)]$ (dBm) - $[55 + 10\log(P)]$ (dB)
 $= -25$ dBm

EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain

ERP (dBm) = EIRP - 2.15



8.1.4 TEST RESULTS

CAT-M Band 2 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3701.47	-33.83	12.60	12.93	-34.16	-13.00	-21.16	H
5551.88	-35.02	13.10	17.11	-39.03	-13.00	-26.03	H
7402.87	-32.90	11.50	22.20	-43.60	-13.00	-30.60	H
3701.47	-34.72	12.60	12.93	-35.05	-13.00	-22.05	V
5551.88	-34.85	13.10	17.11	-38.86	-13.00	-25.86	V
7402.87	-33.14	11.50	22.20	-43.84	-13.00	-30.84	V
CAT-M Band 2 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3760.00	-33.92	12.60	12.93	-34.25	-13.00	-21.25	H
5640.13	-35.04	13.10	17.11	-39.05	-13.00	-26.05	H
7520.17	-33.24	11.50	22.20	-43.94	-13.00	-30.94	H
3760.00	-35.34	12.60	12.93	-35.67	-13.00	-22.67	V
5640.13	-34.54	13.10	17.11	-38.55	-13.00	-25.55	V
7520.17	-33.19	11.50	22.20	-43.89	-13.00	-30.89	V
CAT-M Band 2 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3818.27	-34.93	12.60	12.93	-35.26	-13.00	-22.26	H
5727.50	-34.07	13.10	17.11	-38.08	-13.00	-25.08	H
7637.04	-33.24	11.50	22.20	-43.94	-13.00	-30.94	H
3818.27	-35.20	12.60	12.93	-35.53	-13.00	-22.53	V
5727.50	-34.71	13.10	17.11	-38.72	-13.00	-25.72	V
7637.04	-33.07	11.50	22.20	-43.77	-13.00	-30.77	V



CAT-M Band 2 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3703.46	-34.73	12.60	12.93	-35.06	-13.00	-22.06	H
5554.55	-34.80	13.10	17.11	-38.81	-13.00	-25.81	H
7406.52	-32.42	11.50	22.20	-43.12	-13.00	-30.12	H
3703.46	-35.08	12.60	12.93	-35.41	-13.00	-22.41	V
5554.55	-34.26	13.10	17.11	-38.27	-13.00	-25.27	V
7406.52	-32.70	11.50	22.20	-43.40	-13.00	-30.40	V
CAT-M Band 2 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3759.80	-33.51	12.60	12.93	-33.84	-13.00	-20.84	H
5639.98	-34.88	13.10	17.11	-38.89	-13.00	-25.89	H
7519.85	-32.22	11.50	22.20	-42.92	-13.00	-29.92	H
3759.80	-35.05	12.60	12.93	-35.38	-13.00	-22.38	V
5639.98	-34.41	13.10	17.11	-38.42	-13.00	-25.42	V
7519.85	-32.62	11.50	22.20	-43.32	-13.00	-30.32	V
CAT-M Band 2 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3816.56	-34.74	12.60	12.93	-35.07	-13.00	-22.07	H
5724.77	-34.78	13.10	17.11	-38.79	-13.00	-25.79	H
7633.20	-32.46	11.50	22.20	-43.16	-13.00	-30.16	H
3816.56	-35.02	12.60	12.93	-35.35	-13.00	-22.35	V
5724.77	-34.09	13.10	17.11	-38.10	-13.00	-25.10	V
7633.20	-32.39	11.50	22.20	-43.09	-13.00	-30.09	V



CAT-M Band 2 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3705.30	-33.47	12.60	12.93	-33.80	-13.00	-20.80	H
5557.79	-35.00	13.10	17.11	-39.01	-13.00	-26.01	H
7410.69	-33.00	11.50	22.20	-43.70	-13.00	-30.70	H
3705.30	-35.35	12.60	12.93	-35.68	-13.00	-22.68	V
5557.79	-34.93	13.10	17.11	-38.94	-13.00	-25.94	V
7410.69	-32.29	11.50	22.20	-42.99	-13.00	-29.99	V
CAT-M Band 2 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3759.95	-33.84	12.60	12.93	-34.17	-13.00	-21.17	H
5640.10	-34.27	13.10	17.11	-38.28	-13.00	-25.28	H
7519.86	-33.06	11.50	22.20	-43.76	-13.00	-30.76	H
3759.95	-35.64	12.60	12.93	-35.97	-13.00	-22.97	V
5640.10	-34.48	13.10	17.11	-38.49	-13.00	-25.49	V
7519.86	-32.83	11.50	22.20	-43.53	-13.00	-30.53	V
CAT-M Band 2 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3814.13	-34.71	12.60	12.93	-35.04	-13.00	-22.04	H
5721.21	-34.06	13.10	17.11	-38.07	-13.00	-25.07	H
7628.70	-32.52	11.50	22.20	-43.22	-13.00	-30.22	H
3814.13	-34.85	12.60	12.93	-35.18	-13.00	-22.18	V
5721.21	-34.28	13.10	17.11	-38.29	-13.00	-25.29	V
7628.70	-31.72	11.50	22.20	-42.42	-13.00	-29.42	V



CAT-M Band 2 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3710.43	-34.14	12.60	12.93	-34.47	-13.00	-21.47	H
5565.84	-35.43	13.10	17.11	-39.44	-13.00	-26.44	H
7421.15	-33.45	11.50	22.20	-44.15	-13.00	-31.15	H
3710.43	-34.87	12.60	12.93	-35.20	-13.00	-22.20	V
5565.84	-35.09	13.10	17.11	-39.10	-13.00	-26.10	V
7421.15	-31.91	11.50	22.20	-42.61	-13.00	-29.61	V
CAT-M Band 2 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3760.17	-34.47	12.60	12.93	-34.80	-13.00	-21.80	H
5640.11	-35.11	13.10	17.11	-39.12	-13.00	-26.12	H
7519.94	-32.25	11.50	22.20	-42.95	-13.00	-29.95	H
3760.17	-35.66	12.60	12.93	-35.99	-13.00	-22.99	V
5640.11	-34.38	13.10	17.11	-38.39	-13.00	-25.39	V
7519.94	-32.46	11.50	22.20	-43.16	-13.00	-30.16	V
CAT-M Band 2 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3809.32	-33.93	12.60	12.93	-34.26	-13.00	-21.26	H
5713.88	-35.45	13.10	17.11	-39.46	-13.00	-26.46	H
7618.10	-33.20	11.50	22.20	-43.90	-13.00	-30.90	H
3809.32	-34.89	12.60	12.93	-35.22	-13.00	-22.22	V
5713.88	-34.54	13.10	17.11	-38.55	-13.00	-25.55	V
7618.10	-31.80	11.50	22.20	-42.50	-13.00	-29.50	V



CAT-M Band 2 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3715.84	-34.77	12.60	12.93	-35.10	-13.00	-22.10	H
5574.34	-35.16	13.10	17.11	-39.17	-13.00	-26.17	H
7618.65	-33.54	11.50	22.20	-44.24	-13.00	-31.24	H
3715.84	-35.72	12.60	12.93	-36.05	-13.00	-23.05	V
5574.34	-33.80	13.10	17.11	-37.81	-13.00	-24.81	V
7618.65	-32.09	11.50	22.20	-42.79	-13.00	-29.79	V
CAT-M Band 2 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3760.18	-33.72	12.60	12.93	-34.05	-13.00	-21.05	H
5639.87	-34.42	13.10	17.11	-38.43	-13.00	-25.43	H
7520.05	-32.30	11.50	22.20	-43.00	-13.00	-30.00	H
3760.18	-35.68	12.60	12.93	-36.01	-13.00	-23.01	V
5639.87	-34.54	13.10	17.11	-38.55	-13.00	-25.55	V
7520.05	-31.97	11.50	22.20	-42.67	-13.00	-29.67	V
CAT-M Band 2 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3803.64	-34.54	12.60	12.93	-34.87	-13.00	-21.87	H
5705.39	-34.64	13.10	17.11	-38.65	-13.00	-25.65	H
7607.31	-32.31	11.50	22.20	-43.01	-13.00	-30.01	H
3803.64	-36.02	12.60	12.93	-36.35	-13.00	-23.35	V
5705.39	-33.88	13.10	17.11	-37.89	-13.00	-24.89	V
7607.31	-32.35	11.50	22.20	-43.05	-13.00	-30.05	V



CAT-M Band 2 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3721.41	-34.72	12.60	12.93	-35.05	-13.00	-22.05	H
5581.35	-34.82	13.10	17.11	-38.83	-13.00	-25.83	H
7442.10	-32.46	11.50	22.20	-43.16	-13.00	-30.16	H
3721.41	-35.45	12.60	12.93	-35.78	-13.00	-22.78	V
5581.35	-34.75	13.10	17.11	-38.76	-13.00	-25.76	V
7442.10	-32.81	11.50	22.20	-43.51	-13.00	-30.51	V
CAT-M Band 2 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3759.89	-34.45	12.60	12.93	-34.78	-13.00	-21.78	H
5640.16	-35.45	13.10	17.11	-39.46	-13.00	-26.46	H
7520.26	-32.32	11.50	22.20	-43.02	-13.00	-30.02	H
3759.89	-35.65	12.60	12.93	-35.98	-13.00	-22.98	V
5640.16	-35.05	13.10	17.11	-39.06	-13.00	-26.06	V
7520.26	-32.03	11.50	22.20	-42.73	-13.00	-29.73	V
CAT-M Band 2 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3798.31	-34.09	12.60	12.93	-34.42	-13.00	-21.42	H
5697.43	-35.28	13.10	17.11	-39.29	-13.00	-26.29	H
7596.95	-33.21	11.50	22.20	-43.91	-13.00	-30.91	H
3798.31	-34.71	12.60	12.93	-35.04	-13.00	-22.04	V
5697.43	-34.03	13.10	17.11	-38.04	-13.00	-25.04	V
7596.95	-32.77	11.50	22.20	-43.47	-13.00	-30.47	V



CAT-M Band 4 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3421.21	-34.27	12.90	12.56	-33.93	-13.00	-20.93	H
5131.78	-34.60	13.10	16.32	-37.82	-13.00	-24.82	H
6842.59	-32.34	12.33	21.13	-41.14	-13.00	-28.14	H
3421.21	-35.65	12.90	12.56	-35.31	-13.00	-22.31	V
5131.78	-34.52	13.10	16.32	-37.74	-13.00	-24.74	V
6842.59	-32.67	12.33	21.13	-41.47	-13.00	-28.47	V
CAT-M Band 4 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3465.25	-33.93	12.90	12.56	-33.59	-13.00	-20.59	H
5197.21	-35.14	13.10	16.32	-38.36	-13.00	-25.36	H
6930.15	-33.26	12.33	21.13	-42.06	-13.00	-29.06	H
3465.25	-35.52	12.90	12.56	-35.18	-13.00	-22.18	V
5197.21	-34.27	13.10	16.32	-37.49	-13.00	-24.49	V
6930.15	-33.12	12.33	21.13	-41.92	-13.00	-28.92	V
CAT-M Band 4 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3508.27	-34.06	12.90	12.56	-33.72	-13.00	-20.72	H
5262.90	-34.33	13.10	16.32	-37.55	-13.00	-24.55	H
7015.86	-32.22	12.33	21.13	-41.02	-13.00	-28.02	H
3508.27	-35.78	12.90	12.56	-35.44	-13.00	-22.44	V
5262.90	-34.40	13.10	16.32	-37.62	-13.00	-24.62	V
7015.86	-32.17	12.33	21.13	-40.97	-13.00	-27.97	V



CAT-M Band 4 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3424.20	-34.45	12.90	12.56	-34.11	-13.00	-21.11	H
5136.33	-35.10	13.10	16.32	-38.32	-13.00	-25.32	H
6848.87	-32.54	12.33	21.13	-41.34	-13.00	-28.34	H
3424.20	-35.24	12.90	12.56	-34.90	-13.00	-21.90	V
5136.33	-34.32	13.10	16.32	-37.54	-13.00	-24.54	V
6848.87	-31.97	12.33	21.13	-40.77	-13.00	-27.77	V
CAT-M Band 4 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3465.08	-34.08	12.90	12.56	-33.74	-13.00	-20.74	H
5197.00	-34.00	13.10	16.32	-37.22	-13.00	-24.22	H
6930.11	-32.69	12.33	21.13	-41.49	-13.00	-28.49	H
3465.08	-34.91	12.90	12.56	-34.57	-13.00	-21.57	V
5197.00	-35.15	13.10	16.32	-38.37	-13.00	-25.37	V
6930.11	-32.85	12.33	21.13	-41.65	-13.00	-28.65	V
CAT-M Band 4 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3506.55	-34.91	12.90	12.56	-34.57	-13.00	-21.57	H
5262.50	-34.90	13.10	16.32	-38.12	-13.00	-25.12	H
7012.87	-33.57	12.33	21.13	-42.37	-13.00	-29.37	H
3506.55	-35.38	12.90	12.56	-35.04	-13.00	-22.04	V
5262.50	-34.47	13.10	16.32	-37.69	-13.00	-24.69	V
7012.87	-31.88	12.33	21.13	-40.68	-13.00	-27.68	V



CAT-M Band 4 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3425.46	-34.92	12.90	12.56	-34.58	-13.00	-21.58	H
5137.42	-34.09	13.10	16.32	-37.31	-13.00	-24.31	H
6850.25	-32.79	12.33	21.13	-41.59	-13.00	-28.59	H
3425.46	-34.81	12.90	12.56	-34.47	-13.00	-21.47	V
5137.42	-34.82	13.10	16.32	-38.04	-13.00	-25.04	V
6850.25	-31.90	12.33	21.13	-40.70	-13.00	-27.70	V
CAT-M Band 4 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3465.08	-34.36	12.90	12.56	-34.02	-13.00	-21.02	H
5196.97	-34.83	13.10	16.32	-38.05	-13.00	-25.05	H
6929.99	-33.31	12.33	21.13	-42.11	-13.00	-29.11	H
3465.08	-35.51	12.90	12.56	-35.17	-13.00	-22.17	V
5196.97	-33.97	13.10	16.32	-37.19	-13.00	-24.19	V
6929.99	-32.56	12.33	21.13	-41.36	-13.00	-28.36	V
CAT-M Band 4 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3505.45	-33.87	12.90	12.56	-33.53	-13.00	-20.53	H
5257.35	-34.68	13.10	16.32	-37.90	-13.00	-24.90	H
7010.09	-32.55	12.33	21.13	-41.35	-13.00	-28.35	H
3505.45	-34.93	12.90	12.56	-34.59	-13.00	-21.59	V
5257.35	-33.75	13.10	16.32	-36.97	-13.00	-23.97	V
7010.09	-32.49	12.33	21.13	-41.29	-13.00	-28.29	V



CAT-M Band 4 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3430.21	-33.81	12.90	12.56	-33.47	-13.00	-20.47	H
5145.27	-35.39	13.10	16.32	-38.61	-13.00	-25.61	H
6860.81	-32.99	12.33	21.13	-41.79	-13.00	-28.79	H
3430.21	-35.26	12.90	12.56	-34.92	-13.00	-21.92	V
5145.27	-34.51	13.10	16.32	-37.73	-13.00	-24.73	V
6860.81	-33.15	12.33	21.13	-41.95	-13.00	-28.95	V
CAT-M Band 4 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3464.97	-34.08	12.90	12.56	-33.74	-13.00	-20.74	H
5197.21	-35.42	13.10	16.32	-38.64	-13.00	-25.64	H
6929.88	-33.37	12.33	21.13	-42.17	-13.00	-29.17	H
3464.97	-34.84	12.90	12.56	-34.50	-13.00	-21.50	V
5197.21	-34.27	13.10	16.32	-37.49	-13.00	-24.49	V
6929.88	-32.85	12.33	21.13	-41.65	-13.00	-28.65	V
CAT-M Band 4 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3500.66	-33.68	12.90	12.56	-33.34	-13.00	-20.34	H
5250.50	-34.20	13.10	16.32	-37.42	-13.00	-24.42	H
7000.24	-33.59	12.33	21.13	-42.39	-13.00	-29.39	H
3500.66	-34.58	12.90	12.56	-34.24	-13.00	-21.24	V
5250.50	-34.61	13.10	16.32	-37.83	-13.00	-24.83	V
7000.24	-32.54	12.33	21.13	-41.34	-13.00	-28.34	V



CAT-M Band 4 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3435.22	-34.89	12.90	12.56	-34.55	-13.00	-21.55	H
5152.24	-34.12	13.10	16.32	-37.34	-13.00	-24.34	H
6870.75	-32.51	12.33	21.13	-41.31	-13.00	-28.31	H
3435.22	-34.54	12.90	12.56	-34.20	-13.00	-21.20	V
5152.24	-34.21	13.10	16.32	-37.43	-13.00	-24.43	V
6870.75	-33.07	12.33	21.13	-41.87	-13.00	-28.87	V
CAT-M Band 4 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3465.21	-34.50	12.90	12.56	-34.16	-13.00	-21.16	H
5196.80	-34.08	13.10	16.32	-37.30	-13.00	-24.30	H
6930.11	-32.81	12.33	21.13	-41.61	-13.00	-28.61	H
3465.21	-35.21	12.90	12.56	-34.87	-13.00	-21.87	V
5196.80	-34.75	13.10	16.32	-37.97	-13.00	-24.97	V
6930.11	-33.07	12.33	21.13	-41.87	-13.00	-28.87	V
CAT-M Band 4 / 15MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3495.74	-34.10	12.90	12.56	-33.76	-13.00	-20.76	H
5242.25	-34.81	13.10	16.32	-38.03	-13.00	-25.03	H
6990.31	-33.60	12.33	21.13	-42.40	-13.00	-29.40	H
3495.74	-34.88	12.90	12.56	-34.54	-13.00	-21.54	V
5242.25	-35.04	13.10	16.32	-38.26	-13.00	-25.26	V
6990.31	-32.79	12.33	21.13	-41.59	-13.00	-28.59	V



CAT-M Band 4 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3440.35	-34.78	12.90	12.56	-34.44	-13.00	-21.44	H
5160.55	-34.27	13.10	16.32	-37.49	-13.00	-24.49	H
6880.74	-32.38	12.33	21.13	-41.18	-13.00	-28.18	H
3440.35	-35.89	12.90	12.56	-35.55	-13.00	-22.55	V
5160.55	-34.84	13.10	16.32	-38.06	-13.00	-25.06	V
6880.74	-31.85	12.33	21.13	-40.65	-13.00	-27.65	V
CAT-M Band 4 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3464.80	-33.64	12.90	12.56	-33.30	-13.00	-20.30	H
5197.01	-34.60	13.10	16.32	-37.82	-13.00	-24.82	H
6929.91	-33.38	12.33	21.13	-42.18	-13.00	-29.18	H
3464.80	-35.90	12.90	12.56	-35.56	-13.00	-22.56	V
5197.01	-35.21	13.10	16.32	-38.43	-13.00	-25.43	V
6929.91	-32.56	12.33	21.13	-41.36	-13.00	-28.36	V
CAT-M Band 4 / 20MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
3490.74	-34.20	12.90	12.56	-33.86	-13.00	-20.86	H
5235.12	-34.56	13.10	16.32	-37.78	-13.00	-24.78	H
6980.27	-33.27	12.33	21.13	-42.07	-13.00	-29.07	H
3490.74	-35.81	12.90	12.56	-35.47	-13.00	-22.47	V
5235.12	-33.87	13.10	16.32	-37.09	-13.00	-24.09	V
6980.27	-31.90	12.33	21.13	-40.70	-13.00	-27.70	V



CAT-M Band 5 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1649.19	-33.73	9.56	9.72	-33.89	-13.00	-20.89	H
2473.76	-35.08	10.50	10.86	-35.44	-13.00	-22.44	H
3298.48	-33.03	12.78	11.57	-31.82	-13.00	-18.82	H
1649.19	-34.58	9.56	9.72	-34.74	-13.00	-21.74	V
2473.76	-35.25	10.50	10.86	-35.61	-13.00	-22.61	V
3298.48	-31.81	12.78	11.57	-30.60	-13.00	-17.60	V
CAT-M Band 5 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1672.82	-33.78	9.56	9.72	-33.94	-13.00	-20.94	H
2509.34	-34.51	10.50	10.86	-34.87	-13.00	-21.87	H
3345.66	-32.54	12.78	11.57	-31.33	-13.00	-18.33	H
1672.82	-34.77	9.56	9.72	-34.93	-13.00	-21.93	V
2509.34	-34.74	10.50	10.86	-35.10	-13.00	-22.10	V
3345.66	-33.04	12.78	11.57	-31.83	-13.00	-18.83	V
CAT-M Band 5 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1696.58	-33.86	9.56	9.72	-34.02	-13.00	-21.02	H
2544.75	-35.08	10.50	10.86	-35.44	-13.00	-22.44	H
3393.14	-32.43	12.78	11.57	-31.22	-13.00	-18.22	H
1696.58	-34.71	9.56	9.72	-34.87	-13.00	-21.87	V
2544.75	-34.60	10.50	10.86	-34.96	-13.00	-21.96	V
3393.14	-31.89	12.78	11.57	-30.68	-13.00	-17.68	V



CAT-M Band 5 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1650.64	-34.58	9.56	9.72	-34.74	-13.00	-21.74	H
2476.24	-35.05	10.50	10.86	-35.41	-13.00	-22.41	H
3301.71	-32.54	12.78	11.57	-31.33	-13.00	-18.33	H
1650.64	-35.30	9.56	9.72	-35.46	-13.00	-22.46	V
2476.24	-34.60	10.50	10.86	-34.96	-13.00	-21.96	V
3301.71	-31.86	12.78	11.57	-30.65	-13.00	-17.65	V
CAT-M Band 5 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1672.95	-34.58	9.56	9.72	-34.74	-13.00	-21.74	H
2509.06	-35.27	10.50	10.86	-35.63	-13.00	-22.63	H
3345.62	-32.49	12.78	11.57	-31.28	-13.00	-18.28	H
1672.95	-35.14	9.56	9.72	-35.30	-13.00	-22.30	V
2509.06	-35.20	10.50	10.86	-35.56	-13.00	-22.56	V
3345.62	-31.86	12.78	11.57	-30.65	-13.00	-17.65	V
CAT-M Band 5 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1694.88	-33.92	9.56	9.72	-34.08	-13.00	-21.08	H
2542.11	-34.81	10.50	10.86	-35.17	-13.00	-22.17	H
3389.76	-33.59	12.78	11.57	-32.38	-13.00	-19.38	H
1694.88	-35.07	9.56	9.72	-35.23	-13.00	-22.23	V
2542.11	-34.17	10.50	10.86	-34.53	-13.00	-21.53	V
3389.76	-32.30	12.78	11.57	-31.09	-13.00	-18.09	V



CAT-M Band 5 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1652.87	-33.73	9.56	9.72	-33.89	-13.00	-20.89	H
2479.46	-34.35	10.50	10.86	-34.71	-13.00	-21.71	H
3305.89	-33.57	12.78	11.57	-32.36	-13.00	-19.36	H
1652.87	-35.47	9.56	9.72	-35.63	-13.00	-22.63	V
2479.46	-34.65	10.50	10.86	-35.01	-13.00	-22.01	V
3305.89	-33.04	12.78	11.57	-31.83	-13.00	-18.83	V
CAT-M Band 5 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1672.54	-34.86	9.56	9.72	-35.02	-13.00	-22.02	H
2509.40	-34.92	10.50	10.86	-35.28	-13.00	-22.28	H
3345.51	-32.22	12.78	11.57	-31.01	-13.00	-18.01	H
1672.54	-34.95	9.56	9.72	-35.11	-13.00	-22.11	V
2509.40	-33.92	10.50	10.86	-34.28	-13.00	-21.28	V
3345.51	-32.08	12.78	11.57	-30.87	-13.00	-17.87	V
CAT-M Band 5 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1692.81	-33.91	9.56	9.72	-34.07	-13.00	-21.07	H
2539.11	-34.45	10.50	10.86	-34.81	-13.00	-21.81	H
3385.92	-32.62	12.78	11.57	-31.41	-13.00	-18.41	H
1692.81	-35.22	9.56	9.72	-35.38	-13.00	-22.38	V
2539.11	-33.96	10.50	10.86	-34.32	-13.00	-21.32	V
3385.92	-32.16	12.78	11.57	-30.95	-13.00	-17.95	V



CAT-M Band 5 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1657.87	-34.69	9.56	9.72	-34.85	-13.00	-21.85	H
2486.54	-35.14	10.50	10.86	-35.50	-13.00	-22.50	H
3315.56	-33.63	12.78	11.57	-32.42	-13.00	-19.42	H
1657.87	-35.17	9.56	9.72	-35.33	-13.00	-22.33	V
2486.54	-35.18	10.50	10.86	-35.54	-13.00	-22.54	V
3315.56	-31.85	12.78	11.57	-30.64	-13.00	-17.64	V
CAT-M Band 5 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1672.77	-34.73	9.56	9.72	-34.89	-13.00	-21.89	H
2509.34	-35.12	10.50	10.86	-35.48	-13.00	-22.48	H
3345.88	-33.29	12.78	11.57	-32.08	-13.00	-19.08	H
1672.77	-35.85	9.56	9.72	-36.01	-13.00	-23.01	V
2509.34	-34.41	10.50	10.86	-34.77	-13.00	-21.77	V
3345.88	-32.76	12.78	11.57	-31.55	-13.00	-18.55	V
CAT-M Band 5 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1687.85	-34.83	9.56	9.72	-34.99	-13.00	-21.99	H
2531.86	-34.55	10.50	10.86	-34.91	-13.00	-21.91	H
3375.93	-32.49	12.78	11.57	-31.28	-13.00	-18.28	H
1687.85	-34.58	9.56	9.72	-34.74	-13.00	-21.74	V
2531.86	-35.18	10.50	10.86	-35.54	-13.00	-22.54	V
3375.93	-33.12	12.78	11.57	-31.91	-13.00	-18.91	V



CAT-M Band 12 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1399.34	-33.95	8.17	9.34	-35.12	-13.00	-22.12	H
2098.99	-34.81	9.53	10.42	-35.70	-13.00	-22.70	H
2798.60	-32.69	11.27	11.12	-32.54	-13.00	-19.54	H
1399.34	-35.16	8.17	9.34	-36.33	-13.00	-23.33	V
2098.99	-35.21	9.53	10.42	-36.10	-13.00	-23.10	V
2798.60	-32.72	11.27	11.12	-32.57	-13.00	-19.57	V
CAT-M Band 12 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1414.78	-34.30	8.17	9.34	-35.47	-13.00	-22.47	H
2122.09	-34.66	9.53	10.42	-35.55	-13.00	-22.55	H
2829.56	-32.48	11.27	11.12	-32.33	-13.00	-19.33	H
1414.78	-35.22	8.17	9.34	-36.39	-13.00	-23.39	V
2122.09	-34.48	9.53	10.42	-35.37	-13.00	-22.37	V
2829.56	-33.16	11.27	11.12	-33.01	-13.00	-20.01	V
CAT-M Band 12 / 1.4MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1430.19	-34.89	8.17	9.34	-36.06	-13.00	-23.06	H
2145.44	-35.44	9.53	10.42	-36.33	-13.00	-23.33	H
2861.00	-33.01	11.27	11.12	-32.86	-13.00	-19.86	H
1430.19	-35.51	8.17	9.34	-36.68	-13.00	-23.68	V
2145.44	-34.02	9.53	10.42	-34.91	-13.00	-21.91	V
2861.00	-32.78	11.27	11.12	-32.63	-13.00	-19.63	V



CAT-M Band 12 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1400.74	-34.53	8.17	9.34	-35.70	-13.00	-22.70	H
2101.45	-34.60	9.53	10.42	-35.49	-13.00	-22.49	H
2801.63	-33.63	11.27	11.12	-33.48	-13.00	-20.48	H
1400.74	-34.63	8.17	9.34	-35.80	-13.00	-22.80	V
2101.45	-33.88	9.53	10.42	-34.77	-13.00	-21.77	V
2801.63	-32.54	11.27	11.12	-32.39	-13.00	-19.39	V
CAT-M Band 12 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1414.70	-34.28	8.17	9.34	-35.45	-13.00	-22.45	H
2122.00	-34.09	9.53	10.42	-34.98	-13.00	-21.98	H
2829.81	-33.35	11.27	11.12	-33.20	-13.00	-20.20	H
1414.70	-35.93	8.17	9.34	-37.10	-13.00	-24.10	V
2122.00	-34.71	9.53	10.42	-35.60	-13.00	-22.60	V
2829.81	-32.13	11.27	11.12	-31.98	-13.00	-18.98	V
CAT-M Band 12 / 3MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1428.99	-34.64	8.17	9.34	-35.81	-13.00	-22.81	H
2143.04	-34.07	9.53	10.42	-34.96	-13.00	-21.96	H
2857.60	-32.20	11.27	11.12	-32.05	-13.00	-19.05	H
1428.99	-35.14	8.17	9.34	-36.31	-13.00	-23.31	V
2143.04	-33.88	9.53	10.42	-34.77	-13.00	-21.77	V
2857.60	-32.96	11.27	11.12	-32.81	-13.00	-19.81	V



CAT-M Band 12 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1402.64	-33.60	8.17	9.34	-34.77	-13.00	-21.77	H
2104.25	-34.11	9.53	10.42	-35.00	-13.00	-22.00	H
2805.77	-32.40	11.27	11.12	-32.25	-13.00	-19.25	H
1402.64	-34.55	8.17	9.34	-35.72	-13.00	-22.72	V
2104.25	-34.96	9.53	10.42	-35.85	-13.00	-22.85	V
2805.77	-32.12	11.27	11.12	-31.97	-13.00	-18.97	V
CAT-M Band 12 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1414.56	-34.26	8.17	9.34	-35.43	-13.00	-22.43	H
2122.24	-34.40	9.53	10.42	-35.29	-13.00	-22.29	H
2829.90	-32.43	11.27	11.12	-32.28	-13.00	-19.28	H
1414.56	-35.35	8.17	9.34	-36.52	-13.00	-23.52	V
2122.24	-34.72	9.53	10.42	-35.61	-13.00	-22.61	V
2829.90	-33.18	11.27	11.12	-33.03	-13.00	-20.03	V
CAT-M Band 12 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1426.76	-33.59	8.17	9.34	-34.76	-13.00	-21.76	H
2140.10	-34.88	9.53	10.42	-35.77	-13.00	-22.77	H
2853.95	-32.95	11.27	11.12	-32.80	-13.00	-19.80	H
1426.76	-35.33	8.17	9.34	-36.50	-13.00	-23.50	V
2140.10	-34.96	9.53	10.42	-35.85	-13.00	-22.85	V
2853.95	-32.79	11.27	11.12	-32.64	-13.00	-19.64	V



CAT-M Band 12 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1407.51	-33.83	8.17	9.34	-35.00	-13.00	-22.00	H
2111.91	-34.95	9.53	10.42	-35.84	-13.00	-22.84	H
2815.50	-33.25	11.27	11.12	-33.10	-13.00	-20.10	H
1407.51	-35.63	8.17	9.34	-36.80	-13.00	-23.80	V
2111.91	-34.64	9.53	10.42	-35.53	-13.00	-22.53	V
2815.50	-32.94	11.27	11.12	-32.79	-13.00	-19.79	V
CAT-M Band 12 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1414.76	-33.61	8.17	9.34	-34.78	-13.00	-21.78	H
2122.13	-34.86	9.53	10.42	-35.75	-13.00	-22.75	H
2829.54	-32.17	11.27	11.12	-32.02	-13.00	-19.02	H
1414.76	-35.10	8.17	9.34	-36.27	-13.00	-23.27	V
2122.13	-33.96	9.53	10.42	-34.85	-13.00	-21.85	V
2829.54	-33.08	11.27	11.12	-32.93	-13.00	-19.93	V
CAT-M Band 12 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1421.69	-34.26	8.17	9.34	-35.43	-13.00	-22.43	H
2132.81	-34.36	9.53	10.42	-35.25	-13.00	-22.25	H
2843.83	-33.10	11.27	11.12	-32.95	-13.00	-19.95	H
1421.69	-35.66	8.17	9.34	-36.83	-13.00	-23.83	V
2132.81	-34.53	9.53	10.42	-35.42	-13.00	-22.42	V
2843.83	-31.90	11.27	11.12	-31.75	-13.00	-18.75	V



CAT-M Band 13 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1559.14	-48.43	8.17	9.34	-49.60	-40.00	-9.60	H
2338.47	-46.26	9.53	10.42	-47.15	-13.00	-34.15	H
3118.23	-45.63	11.27	11.12	-45.48	-13.00	-32.48	H
1559.14	-47.72	8.17	9.34	-48.89	-40.00	-8.89	V
2338.47	-46.13	9.53	10.42	-47.02	-13.00	-34.02	V
3118.23	-46.59	11.27	11.12	-46.44	-13.00	-33.44	V
CAT-M Band 13 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1563.97	-48.47	8.17	9.34	-49.64	-40.00	-9.64	H
2345.86	-47.11	9.53	10.42	-48.00	-13.00	-35.00	H
3127.81	-45.55	11.27	11.12	-45.40	-13.00	-32.40	H
1563.97	-47.45	8.17	9.34	-48.62	-40.00	-8.62	V
2345.86	-46.40	9.53	10.42	-47.29	-13.00	-34.29	V
3127.81	-46.37	11.27	11.12	-46.22	-13.00	-33.22	V
CAT-M Band 13 / 5MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1569.00	-48.30	8.17	9.34	-49.47	-40.00	-9.47	H
2353.30	-46.31	9.53	10.42	-47.20	-13.00	-34.20	H
3138.23	-45.26	11.27	11.12	-45.11	-13.00	-32.11	H
1569.00	-48.45	8.17	9.34	-49.62	-40.00	-9.62	V
2353.30	-47.34	9.53	10.42	-48.23	-13.00	-35.23	V
3138.23	-46.30	11.27	11.12	-46.15	-13.00	-33.15	V



CAT-M Band 13 / 10MHz / QPSK / RB Size 1 Offset 0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dBm)	Polarity
1563.88	-48.35	8.17	9.34	-49.52	-40.00	-9.52	H
2345.75	-47.32	9.53	10.42	-48.21	-13.00	-35.21	H
3128.01	-45.20	11.27	11.12	-45.05	-13.00	-32.05	H
1563.88	-48.60	8.17	9.34	-49.77	-40.00	-9.77	V
2345.75	-46.02	9.53	10.42	-46.91	-13.00	-33.91	V
3128.01	-46.09	11.27	11.12	-45.94	-13.00	-32.94	V



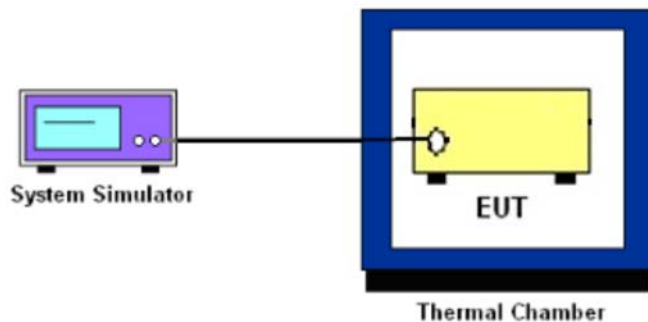
9. FREQUENCY STABILITY

9.1 DESCRIPTION OF FREQUENCY STABILITY MEASUREMENT

9.1.1 MEASUREMENT METHOD

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

9.1.2 TEST SETUP



9.1.3 TEST PROCEDURES FOR TEMPERATURE VARIATION

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

9.1.4 TEST PROCEDURES FOR VOLTAGE VARIATION

1. The testing follows FCC KDB 971168 D01v01r03 Section 9.
2. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.



9.1.5 TEST RESULTS

CAT-M Band 2 (QPSK) / 1880MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	20.22	0.011	2.5ppm	PASS
40		30.36	0.016		
30		25.23	0.013		
20		29.84	0.016		
10		15.98	0.009		
0		23.69	0.013		
-10		35.63	0.019		
-20		25.22	0.013		
-30		33.87	0.018		
20	Maximum Voltage	20.86	0.011		
20	BEP	33.54	0.018		

CAT-M Band 2 (QPSK) / 1880MHz / BW20M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	13.88	0.007	2.5ppm	PASS
40		22.27	0.012		
30		13.11	0.007		
20		18.17	0.010		
10		16.35	0.009		
0		13.34	0.007		
-10		32.42	0.017		
-20		14.73	0.008		
-30		18.58	0.010		
20	Maximum Voltage	34.55	0.018		
20	BEP	30.19	0.016		



CAT-M Band 4 (QPSK) / 1733MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	27.03	0.016	2.5ppm	PASS
40		16.62	0.010		
30		18.62	0.011		
20		34.78	0.020		
10		29.92	0.017		
0		15.40	0.009		
-10		32.53	0.019		
-20		30.07	0.017		
-30		22.73	0.013		
20	Maximum Voltage	17.01	0.010		
20	BEP	35.69	0.021		

CAT-M Band 4 (QPSK) / 1733MHz / BW20M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	13.42	0.008	2.5ppm	PASS
40		35.40	0.020		
30		23.09	0.013		
20		33.01	0.019		
10		20.71	0.012		
0		28.44	0.016		
-10		13.32	0.008		
-20		13.19	0.008		
-30		30.14	0.017		
20	Maximum Voltage	21.28	0.012		
20	BEP	30.05	0.017		



CAT-M Band 5 (QPSK) / 836.5MHz / BW5M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	23.96	0.034	2.5ppm	PASS
40		26.87	0.038		
30		35.96	0.051		
20		29.67	0.042		
10		15.38	0.022		
0		30.70	0.043		
-10		28.00	0.004		
-20		28.92	0.041		
-30		34.73	0.049		
20	Maximum Voltage	25.47	0.036		
20	BEP	34.09	0.048		

CAT-M Band 5 (QPSK) / 836.5MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	35.66	0.050	2.5ppm	PASS
40		30.09	0.042		
30		22.59	0.032		
20		14.05	0.020		
10		30.34	0.043		
0		14.32	0.020		
-10		32.35	0.005		
-20		33.53	0.047		
-30		15.61	0.022		
20	Maximum Voltage	16.47	0.023		
20	BEP	30.23	0.043		



CAT-M Band 12 (QPSK) / 707.5MHz / BW5M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	32.84	0.046	2.5ppm	PASS
40		29.14	0.041		
30		34.00	0.048		
20		36.24	0.051		
10		30.60	0.043		
0		29.79	0.042		
-10		28.65	0.004		
-20		14.41	0.020		
-30		19.89	0.028		
20	Maximum Voltage	20.80	0.029		
20	BEP	16.43	0.023		

CAT-M Band 12 (QPSK) / 707.5MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	31.11	0.044	2.5ppm	PASS
40		30.09	0.042		
30		20.53	0.029		
20		24.00	0.034		
10		26.22	0.037		
0		20.07	0.028		
-10		24.88	0.004		
-20		26.52	0.037		
-30		28.11	0.040		
20	Maximum Voltage	12.22	0.017		
20	BEP	30.59	0.043		



CAT-M Band 13 (QPSK) / 782MHz / BW5M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	28.34	0.040	2.5ppm	PASS
40		26.39	0.037		
30		16.55	0.023		
20		26.07	0.037		
10		22.23	0.031		
0		26.37	0.037		
-10		17.65	0.002		
-20		12.95	0.018		
-30		28.71	0.040		
20	Maximum Voltage	14.67	0.021		
20	BEP	12.88	0.018		

CAT-M Band 13 (QPSK) / 782MHz / BW10M					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	12.13	0.017	2.5ppm	PASS
40		29.10	0.041		
30		12.13	0.017		
20		21.59	0.030		
10		23.69	0.033		
0		25.02	0.035		
-10		28.25	0.004		
-20		32.10	0.045		
-30		15.64	0.022		
20	Maximum Voltage	28.91	0.041		
20	BEP	28.82	0.041		



APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※

