

FCC PART 22H, PART 24E

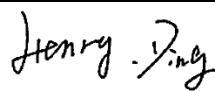
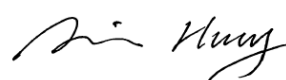
TEST REPORT

For

DEKAI TELECOM CO., LIMITED

Flat 7A, 7/F, Kimley Commercial Bldg., 142-146 Queen's Road Central, Hong Kong

FCC ID: W7670A00-2

Report Type: Original Report	Product Type: GSM FIXED WIRELESS TERMINAL WITH PSTN
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Report Number: RSZ111214010-00	
Report Date: 2012-03-06	
Reviewed By: Alvin Huang EMC Engineer	
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* This report contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *DEKAI TELECOM CO., LIMITED*'s product, model number: 70A00-2 (FCC ID: W7670A00-2) or the "EUT" in this report is a GSM FIXED WIRELESS TERMINAL WITH PSTN, which was measured approximately: 20.7 cm (L) x 12.8 cm (W) x 2.5 cm (H), rated input voltage: DC 12V from adapter.

** All measurement and test data in this report was gathered from production sample serial number: 1112039 (Assigned by BACL, Shenzhen). The EUT was received on 2011-12-14.*

Objective

This report is prepared on behalf of *DEKAI TELECOM CO., LIMITED* in accordance with Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E of the Federal Communication Commissions rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Related Submittal(s)/Grant(s)

FCC ID: XMR-16182009002 which was granted on 2009-08-31.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services

Applicable Standards: TIA/EIA 603-C, ANSI C63.4-2009.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-C.

The Cellular/PCS item test was performed with the EUT operating at normal mode.

Equipment Modifications

No modification was made to the EUT.

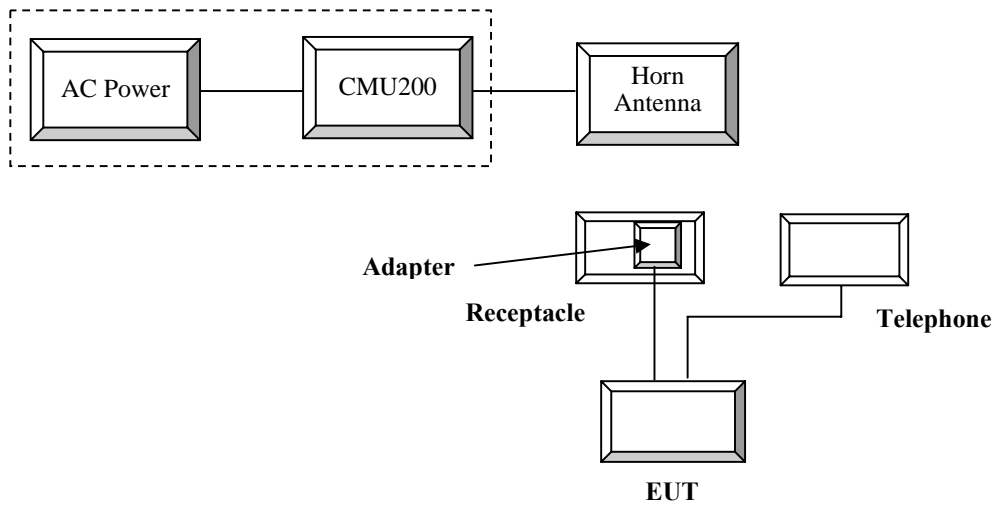
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SPIKER	Telephone	HP100	N/A

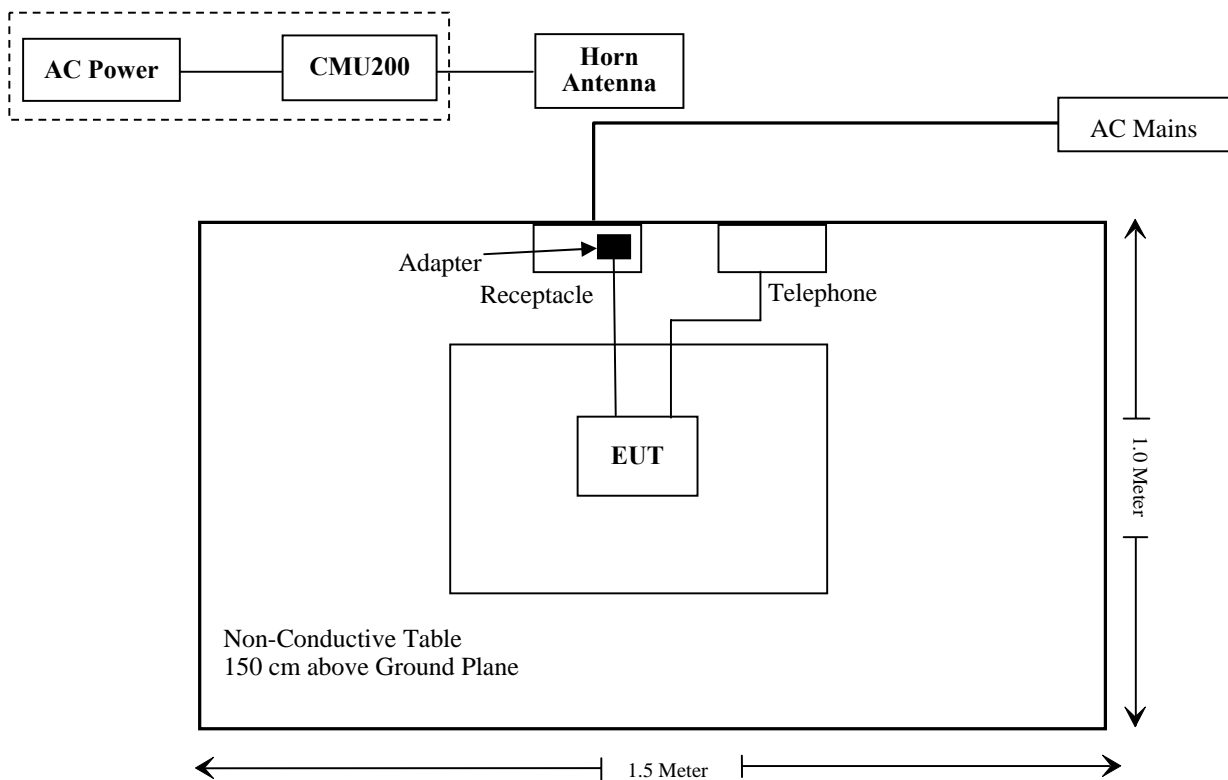
External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detectable Power Cable	1.5	Adapter	EUT
Unshielded Detectable RJ11 Cable	1.0	EUT	Telephone

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1091	RF Exposure	Compliance
§2.1046; § 22.913 (a); § 24.232 (c)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905 § 22.917; § 24.238	Occupied Bandwidth	Compliance*
§ 2.1051, § 22.917 (a); § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliance*
§ 2.1053 § 22.917 (a); § 24.238 (a)	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a)	Out of band emission, Band Edge	Compliance*
§ 2.1055 § 22.355; § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance*

Note: * The GSM module RF was test in Shenzhen Electronic Product Quality Testing Center with FCC ID: XMR-16182009002 granted on 2009-08-31.

FCC §1.1307 & §2.1091 - RF EXPOSURE INFORMATION

Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Band	Frequency (MHz)	Output power (mW)	Antenna Gain (dBi)	Antenna Gain (Number)	Minimum distance (cm)	Calculation result (mW/ cm ²)	MPE Limit (mW/ cm ²)	Result
Cellular	836.6	2108.6	2.5	1.78	25	0.478	0.558	Pass
PCS	1909.8	968.3	2.5	1.78	25	0.220	1.000	Pass

Result: The MPE level is below the MPE limits at 25 cm distance for General Population/Uncontrolled Exposure as stated in OET-65-C. The precautions are outlined in the user's manual to prevent exposure to high levels of RF energy.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) - RF OUTPUT POWER

Applicable Standard

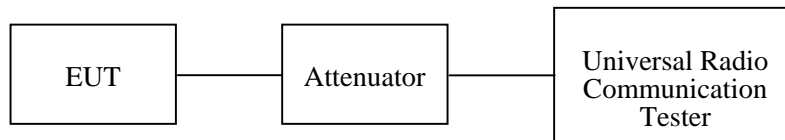
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §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..

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



Radiated method:

TIA 603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
HP	Signal Generator	HP8657A	2849U00982	2011-10-28	2012-10-27
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
HP	Synthesized Sweeper	8341B	2624A00116	2011-11-07	2012-11-06
COM POWER	Dipole Antenna	AD-100	041000	2011-09-25	2012-09-24
A.H. System	Horn Antenna	SAS-200/571	135	2011-05-17	2012-05-16
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2011-06-11	2012-06-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Henry Ding on 2012-01-10.

Conducted Power

The test data is referred to FCC ID: XMR-16182009002 certified on 2009-08-31, report No.: SH09070021AR02, which was tested in Shenzhen Electronic Product Quality Testing Center.

Radiated Power**ERP for Cellular Band (Part 22H)**

GSM 850:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBd)	Cable Loss (dB)	Absolute Level (dBm)	Part 22H
Frequency (MHz)	S.A. Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Ant. Polar (H/V)				Limit (dBm)
Low Channel											
824.2	86.74	132	1.8	H	824.2	20.1	H	0	0.9	19.2	38.45
824.2	94.68	241	1.7	V	824.2	28.1	V	0	0.9	27.2	38.45
Middle Channel											
836.6	86.79	321	1.6	H	836.6	20.2	H	0	0.9	19.3	38.45
836.6	93.8	202	1.5	V	836.6	27.2	V	0	0.9	26.3	38.45
High Channel											
848.8	88.31	139	1.5	H	848.8	20.7	H	0	0.9	19.8	38.45
848.8	96.2	140	1.7	V	848.8	29.6	V	0	0.9	28.7	38.45

EIRP for PCS Band (Part 24E)

PCS 1900:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Part 24E
Frequency (MHz)	S.A. Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Ant. Polar (H/V)				Limit (dBm)
Low Channel											
1850.2	82.49	54	1.6	H	1850.2	15.8	H	6.1	1	20.90	33
1850.2	90.25	142	1.7	V	1850.2	23.7	V	6.1	1	28.80	33
Middle Channel											
1880.0	80.82	253	1.8	H	1880.0	14.2	H	6.1	1	19.30	33
1880.0	89.34	213	1.7	V	1880.0	22.8	V	6.1	1	27.90	33
High Channel											
1909.8	81.61	157	1.6	H	1909.8	15.0	H	6.1	1	20.10	33
1909.8	89.73	167	1.7	V	1909.8	23.2	V	6.1	1	28.30	33

FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH

Applicable Standard

FCC §2.1049, §22.917, §22.905 and §24.238.

Test Data: Compliance

The test data is referred to FCC ID: XMR-16182009002 certified on 2009-08-31, report No.: SH09070021AR02, which was tested in Shenzhen Electronic Product Quality Testing Center.

FCC §2.1051, §22.917(a) & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

FCC §2.1051, §22.917(a) and §24.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Data: Compliance

The test data is referred to FCC ID: XMR-16182009002 certified on 2009-08-31, report No.: SH09070021AR02, which was tested in Shenzhen Electronic Product Quality Testing Center.

FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS**Applicable Standard**

FCC § 2.1053, §22.917 and § 24.238.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

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.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

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 emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log₁₀ (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
HP	Signal Generator	HP8657A	2849U00982	2010-10-28	2012-10-27
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
HP	Synthesized Sweeper	8341B	2624A00116	2011-11-07	2012-11-06
COM POWER	Dipole Antenna	AD-100	041000	2011-09-25	2012-09-24
A.H. System	Horn Antenna	SAS-200/571	135	2011-05-17	2012-05-16
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2011-06-11	2012-06-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Henry Ding on 2012-01-10.

Test mode: Transmitting

Cellular Band (Part 22H)

30MHz - 10 GHz: (worst case as below)

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dB)	Cable Loss (dB)			
High Channel											
2546.4	50.60	186	1.8	V	2546.4	-42.9	7.2	1.21	-36.91	-13	23.91
3395.2	47.25	12	1.5	V	3395.2	-45.8	6.7	1.39	-40.49	-13	27.49
1697.6	51.61	68	1.6	V	1697.6	-49.9	6.2	0.95	-44.65	-13	31.65
3395.2	43.84	192	1.9	H	3395.2	-50.5	6.7	1.39	-45.19	-13	32.19
2546.4	43.48	136	1.7	H	2546.4	-58.1	7.2	1.21	-52.11	-13	39.11
1697.6	44.53	69	1.6	H	1697.6	-59.8	6.2	0.95	-54.55	-13	41.55

PCS Band (Part 24E)

30MHz - 20 GHz: (worst case as below)

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain (dB)	Cable Loss (dB)			
Low Channel											
7400.8	41.79	232	1.7	V	7400.8	-48.6	7.8	2.07	-42.87	-13	29.87
7400.8	39.08	234	1.6	H	7400.8	-50.6	7.8	2.07	-44.87	-13	31.87
5550.6	40.03	267	1.5	V	5550.6	-51.6	8.3	1.77	-45.07	-13	32.07
3700.4	44.09	341	1.5	V	3700.4	-50.3	6.7	1.50	-45.10	-13	32.10
5550.6	38.94	257	1.4	H	5550.6	-54.4	8.3	1.77	-47.87	-13	34.87
3700.4	39.79	305	1.2	H	3700.4	-54.8	6.7	1.50	-49.60	-13	36.60

FCC §22.917(a) & §24.238(a) - BAND EDGES

Applicable Standard

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 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.

Test Data: Compliance

The test data is referred to FCC ID: XMR-16182009002 certified on 2009-08-31, report No.: SH09070021AR02, which was tested in Shenzhen Electronic Product Quality Testing Center.

FCC §2.1055, §22.355 & §24.235 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

TIA 603-D section 2.2.2

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2011-06-04	2012-06-03
Rohde&Schwarz	Universal Radio Communication Tester	CMU200	109038	2011-04-11	2012-04-10

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Henry Ding on 2012-02-12.

Cellular Band (Part 22H)

Middle Channel, $f_o = 836.6\text{MHz}$				
Temperature (°C)	Power Supplied (V_{AC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	120	-12	-0.0143	2.5
-20		-7	-0.0084	2.5
-10		-12	-0.0143	2.5
0		-16	-0.0191	2.5
10		-7	-0.0084	2.5
20		-13	-0.0155	2.5
30		-7	-0.0084	2.5
40		-12	-0.0143	2.5
50		-6	-0.0072	2.5
25	V max.=138	-8	-0.0096	2.5
	V min.= 102	-7	-0.0084	2.5

PCS Band (Part 24E)

Middle Channel, $f_o = 1880.0\text{MHz}$				
Temperature (°C)	Power Supplied (V_{AC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	-8	-0.0043	pass
-20		-12	-0.0064	pass
-10		-9	-0.0048	pass
0		-11	-0.0059	pass
10		-9	-0.0048	pass
20		-9	-0.0048	pass
30		-7	-0.0037	pass
40		-8	-0.0043	pass
50		-9	-0.0048	pass
25	V max.=138	-7	-0.0037	pass
	V min.= 102	-9	-0.0048	pass

***** END OF REPORT *****