

Necessary Explanations to present to TELEC for certification.

1. Outline of Design and Development

We need more explanations in details in writing with describing exact names of parts and numerical values.

1) How "Stability of Frequency" is designed ?

We design and control the frequency stability by Phase-locked-loop control implemented in the Synthesizers contained in the *HFA3683 RF-IF converter IC, U21*, and the *HFA3783 IQ Modulator and demodulator IC, U14*. VCO's (*DMP-VCX2074, U23 for RF, DMP-VCX743, U15 for IF*) feed the LO to the synthesizer and their frequencies are compared to reference clock with temperature-guaranteed stability of +/-25ppm with a stabilized power supply.

2) How "Spurious Emissions" is suppressed ?

Components of Spurious are few due to the fact that we design to get the Transmission Frequency directly from the output of VCO, and in addition we suppress the emission from antenna by inserting BPF (SAW filter, FL1 for the IF) and *two* BPF in the RF transmission chain--*FL4* before the PA and *FL3* between the PA and the antenna..

3) How "Frequency Modulation" is controlled and limited ?

We utilized the balanced differential analog signals from the accurate transmit DAC inside the DSS Base Band Processor *HFA3861, U10* .as the input to the IQ modulator inside *HFA3783, U14*. In addition, this signal is dc-coupled and digitally filtered. The combined accuracy in the IQ input and the base-band filtering keeps the spread bandwidth constant.

4) How "Transmit Power" is controlled and limited ?

We design to stabilize the Transmission Power by reading the power level from the voltage of a *detector* integrated with *the Power Amp IC, HFA3983, U24* and then adjust the drive amp gain to maintain a constant transmission power.

5) How "secondarily emitted radio wave from Receiver" is suppressed ?

We implemented automatic gain control (AGC) for the receiving circuit. The AGC works to keep the amplitude of the received signal constant along the receiving chain to minimize spurious signal growth due to the non-linearity of the components of the receiving circuit.

2. Considerations to environment of use.

We need more explanations in details with describing exact names of parts and numerical values.

1) Temperature Test : ETSI 300 328 tested at -0°C to +55C

2) Humidity Test ETSI 300 019 tested for 5 days at >92% RH at 50°C

3. Designed Specifications and Acceptable Technical Reference Specifications

(1) Transmitter

* Frequency Tolerance

Designed value : $< \pm 25$ ppm

Technical reference ETS 300 328

* Occupied Frequency Bandwidth Tolerance

Designed value : $F_{center} \pm 13$ MHz at -25dBc points

Technical reference : FCC part 15.247

* Spreading bandwidth

Designed value : 11 MHz at -10dB

Technical reference : FCC part 15.247

* Spreading Factor.

Value : 11 Mchips/sec at 1.375 Msymbols/sec at 11 mbps datarate.

* Spurious Emission Strength

Designed value : in compliance with ETS 300328 and FCC part 15.247

Technical reference: ETS 300328 and FCC part 15.247

* Antenna Power and its tolerance

Design value : +13.6dBm +1dB, -2dB

Technical reference : ETS 300 328 and FCC part 15.247

* Emitted power to adjacent channel

Design value : < -30 dBc

Technical reference : FCC part 15.247

(2) Receiver

* Secondarily emitted radio wave strength

Designed value : in compliance with ETS 300328 and FCC part 15.247

Technical reference: ETS 300328 and FCC part 15.247

4. Explanations of Operations at every part (section) based on Block Diagram.

See attached data sheets in pdf format for an example.